PHOTOFACT* Folder with CIRCUITRACE*

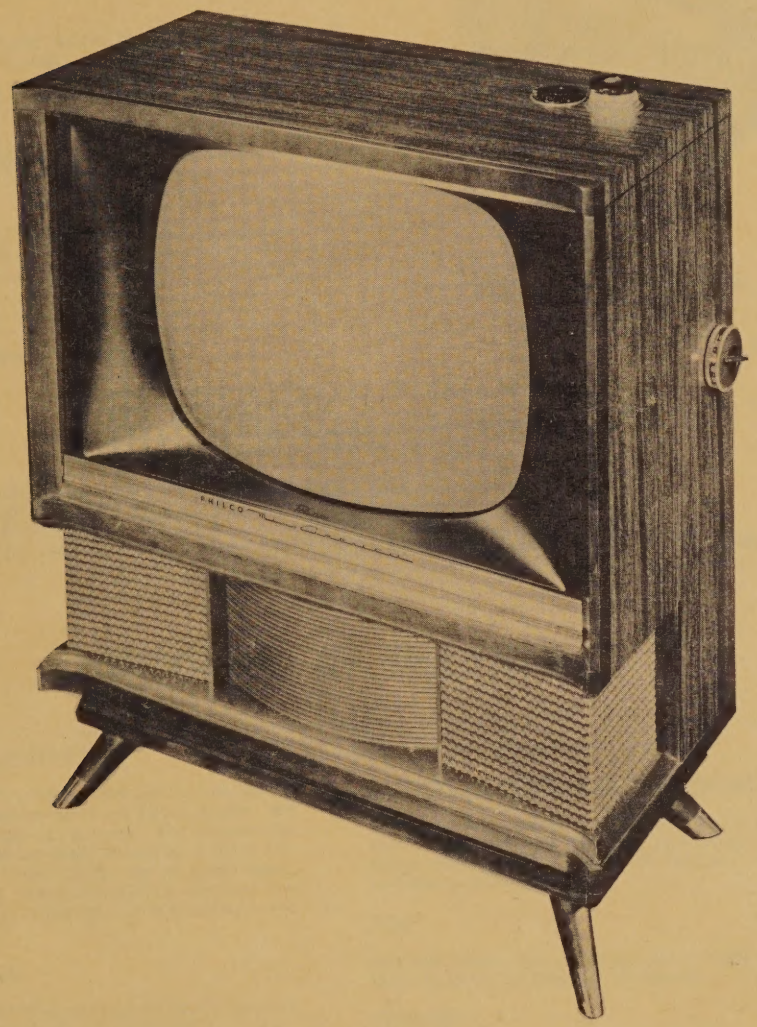
**PHILCO CHASSIS
9L60, U**

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PHILCO CHASSIS
9L60, U



MODEL UG4660SM (CH. 9L60U)

PHILCO CHASSIS
9L60, U

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SET 429 FOLDER 1

PHOTOFACT* Folder

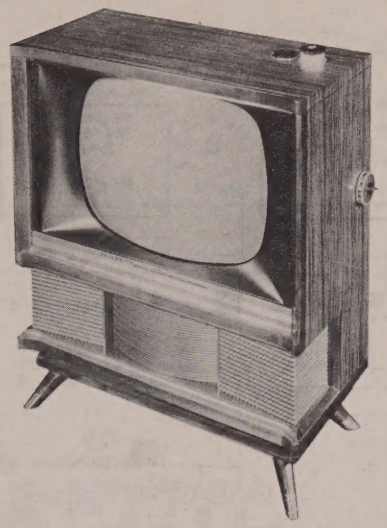
with CIRCUITRACE*

PHILCO CHASSIS 9L60, U

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 top and 2 side push-on type knobs.
2. Remove 10 wood screws holding rear cover. Remove rear cover.
3. Remove picture tube socket, yoke plug, tuner, speaker and HV leads.
4. Remove 1 metal screw under On-Off-Volume knob holding control and pilot light bracket.
5. Remove 2 wood screws holding top rear control bracket to cabinet.
6. Remove 8 bottom chassis bolts.
7. Remove chassis.
8. Remove 1 wood screw holding tuner bracket to cabinet. Remove tuner assembly.



MODEL UG4660SM (CH. 9L60U)

TRADE NAME	Philco	MODELS	CHASSIS
		G4240, L, G4656S, G4658S, SL, SW, G4660S, SL,SM, G4662, P, G6628, L, G6632S, SL, SW	9L60
		UG4240, L, UG4656S, UG4658S, SL, SW, UG4660S, SL, SM, UG4662, P, UG6628, L, UG6632S, SL, SW	9L60U
MANUFACTURER	Philco Corp., Tioga & "C" Streets, Philadelphia, Pa.		
TUBES	Eighteen (VHF), Nineteen (UHF)		
POWER SUPPLY	105-120 Volts AC, 60 Cycle	RATING 220 Watts, 2 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13VHF, 14 thru 83UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at 1 o'clock, proceed in a counterclockwise direction adjusting for best picture and sound.

SAFETY GLASS REMOVAL

Remove 4 wood screws holding safety glass metal trim at top. Tilt glass out at top and lift up to remove.

SPECIAL ADJUSTMENTS

A. AGC
The AGC may be varied in steps by means of a range switch. (For location, see tube placement chart.)

B. Focus
The focus may be varied in steps by the position of a plug in the Focus Adjustment board.

C. Width
The width may be varied by means of a Width control. (For location, see tube placement chart.)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

To adjust the Horizontal Multivibrator set the Horizontal Hold to the center of its range and adjust the Horizontal Range control to syncrhonize the picture. (For location, see tube placement chart.)

FUSE

One fuse is used for low voltage power supply protection and two fuse wires for filament protection.

CENTERING

Centering is accomplished by adjusting the Vert. and Horiz. Centering Magnets located on yoke rear cover. Adjust until the picture is centered.

PIN CUSHION CORRECTION

Reduce the picture size so that the sides of the raster are visible. Position the one magnet so that all sides are straight.

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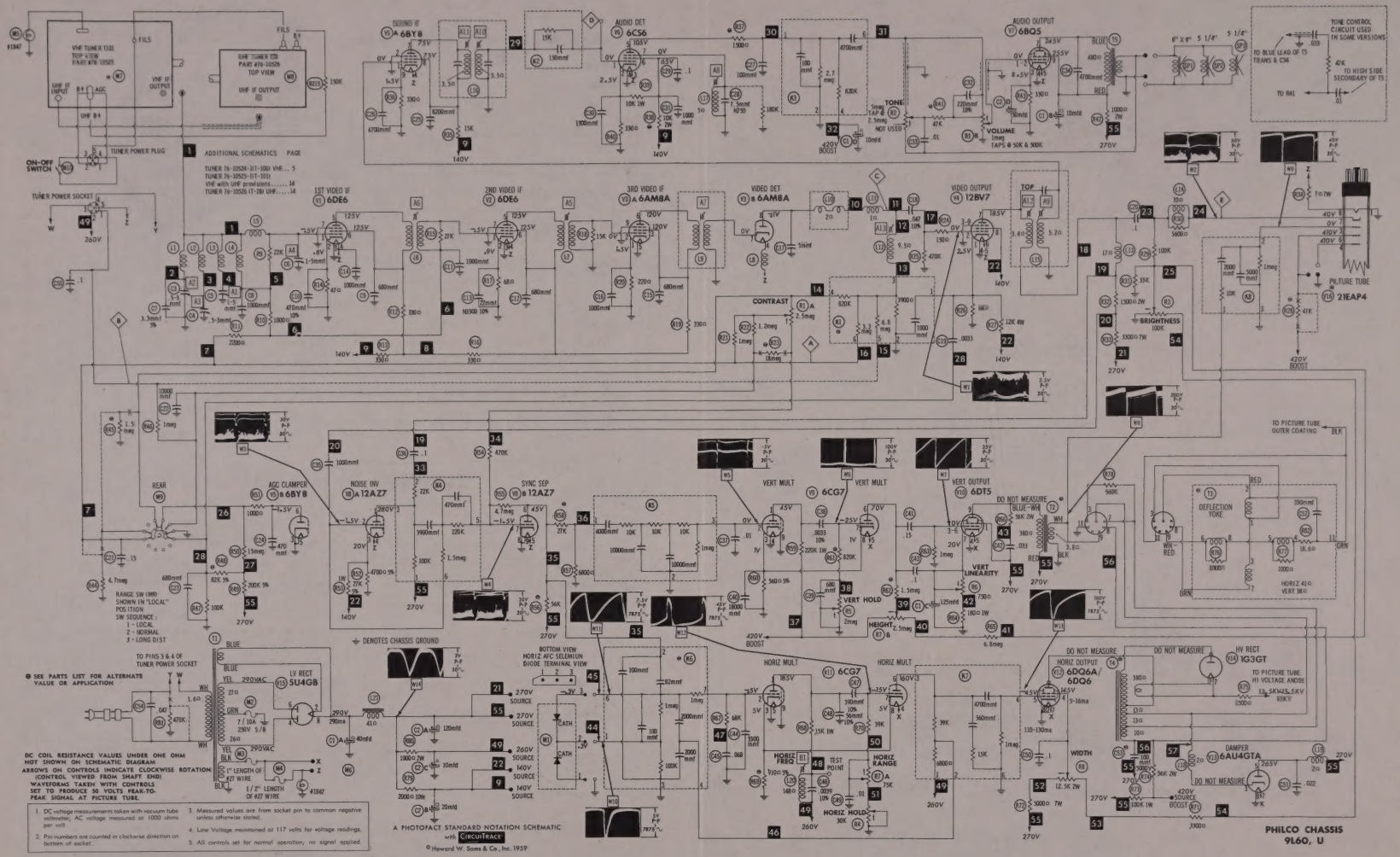
PHILCO CHASSIS 9L60, U
PHILCO CHASSIS 9L60, U
SET 429 FOLDER 1


TUNER POWER PLUG
ON-OFF SWITCH
TUNER POWER SOCKET
ADDITIONAL SCHEMATICS PAGE
TUNER 76-1052M-3IT-100I VHF... 5
TUNER 76-1052S-3IT-101I
VHF with UHF provisions..... 14
TUNER 76-1052B IT-2BI UHF..... 14
1ST VIDEO IF V1 6DE6
2ND VIDEO IF V2 6DE6
3RD VIDEO IF V3A 6AM8A
VIDEO DET V3B 6AM8A
VIDEO OUTPUT V4 12BV7
AUDIO DET V5 6CS6
AUDIO OUTPUT V7 6BQ5
CONTRAST
BRIGHTNESS
VOLUME
TONE
PICTURE TUBE V15 21EAP4
AGC CLAMPER V6 6BY8
NOISE INV V8A 12AZ7
SYNC SEP V8B 12AZ7
VERT MULT V9 6CG7
VERT OUTPUT V10 6DT5
VERT LINEARITY
VERT HOLD
HEIGHT
HORIZ MULT V11 6CG7
HORIZ OUTPUT V12 6DQ6A/6DQ6
HV RECT V14 1G3GT
DAMPER V13 6AU4GTA
WIDTH
HORIZ FREQ
HORIZ RANGE
HORIZ HOLD
TEST POINT
LV RECT V15 5U4GB
RANGE SW (M9) SHOWN IN "LOCAL" POSITION
SW SEQUENCE:
1 - LOCAL
2 - NORMAL
3 - LONG DIST
DENOTES CHASSIS GROUND
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE
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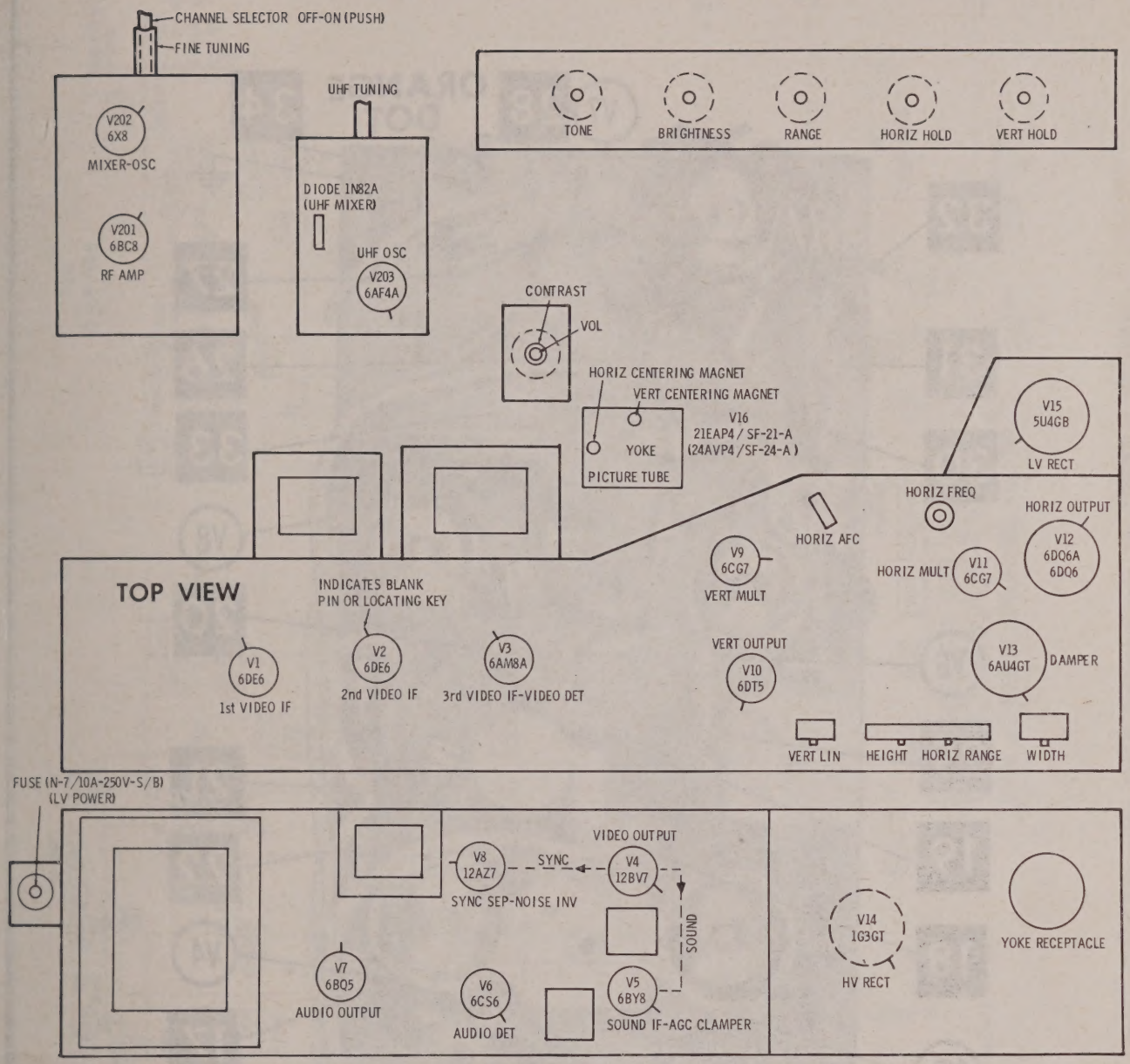
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

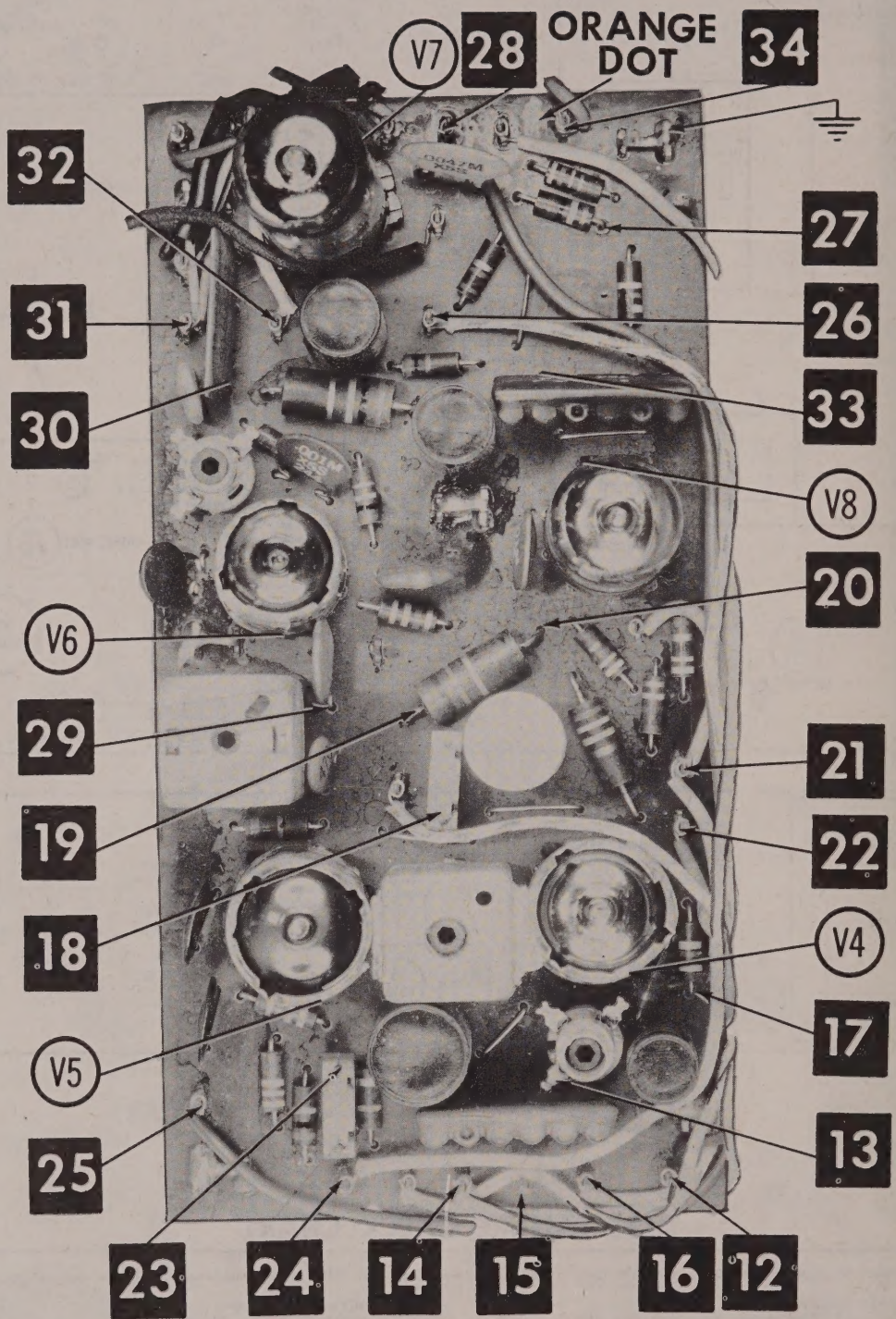
The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Fuse (7/10A), Fuse Wire (F11), V15

SWEEP FAILURE
No raster, has sound - Rectifier (Horiz. AFC), V11, V12, V13, V14, V16
No vertical deflection - V9, V10
Poor vert. linearity or foldover - V9, V10
Poor horiz. linearity or foldover - V11, V12, V13
Narrow picture - V11, V12, V13, V15
Vert. off freq. - V9
Horiz. off freq. - V11

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V1, V2, V3, V4
No pic, no sound, has snow - V201, V202, V1, (V203, UHF Mixer Diode UHF only)
No pic, has sound, has raster - V4, V16
Has pic, no sound - V5, V6, V7
Overloaded picture - V5

SYNC FAILURE
No vert. sync - V8
No horiz. sync - V8, Rectifier (Horiz. AFC)
No vert. or horiz. sync - V8



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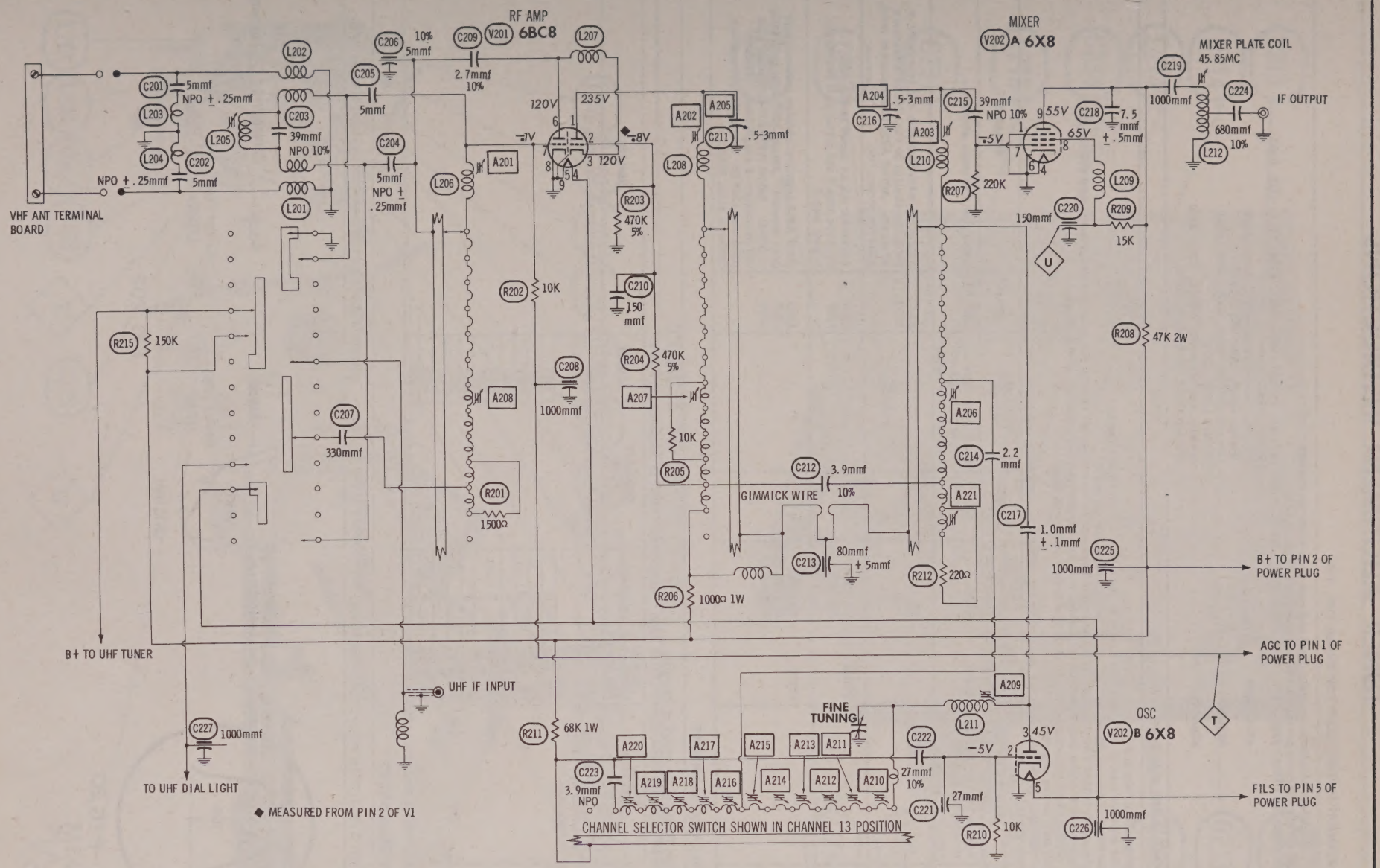
VERT, SYNC & SOUND PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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VHF TUNER with UHF provisions 76-10525-1 (T-101)

PHILCO CHASSIS 9160, U

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS FOR TUNER T100, T101

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools:

A201, A202, A203, A206, A207, A208, A221	General Cement #5009, 8195, 8274, 8275, 8728, 8987 Walsco #2531
A204, A205	General Cement #5000, 5003, 5009, 8290 Walsco #2520, 2523, 2525, 2537
A209 thru A220	General Cement #8729, 8988, 8989, 9294 Walsco #2532, 2538
Mixer Plate Coil	General Cement #8606, 8606L, 8282, 9295 Walsco #2526, 2543, 2544, 2545

VHF RF AND MIXER ALIGNMENT

Set Range switch to "Normal".
Connect the negative lead of a 1.5 volt bias supply to point Ⓣ. Positive to chassis.
Detune the Mixer Plate coil by connecting a 10 to 20mmf capacitor across it.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC	210MC	13	Vert. Amp. thru 10K to point Ⓤ. Low side to chassis.	A201	Adjust for maximum amplitude.
2.	"	"	"	211.25MC	"	"	A202, A203	Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown. Adjust A202 to set marker level, A203 for proper tilt.
3.	"	"	177MC	174.0MC 180.0MC	7	"	A204, A205	Adjust for tilt as shown in Fig. 202. Recheck step 2 and retouch, if necessary. Repeat step 3.
4.	"	"	85MC	82.0MC 85.0MC 88.0MC	6	"	A206, A207, A208	Turn A206 counterclockwise until a single peak appears. Adjust A207 until peak falls at 85MC. Adjust A208 for maximum gain and symmetry of single peak. Retouch A206 and A207 for symmetrical response centered about 85MC.

VHF OSCILLATOR ALIGNMENT

Set the Fine Tuning to the center of its range.
This procedure uses the traps of the Video IF strip. Make certain Video IF Alignment is correct.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	209.75MC (400∿ 30% AM Mod)	13	Across Video Detector load	A209	Adjust for MINIMUM scope indication.
			203.75MC	12		A210	
			197.75MC	11		A211	
			191.75MC	10		A212	
			185.75MC	9		A213	
			179.75MC	8		A214	
			173.75MC	7		A215	
			81.75MC	6		A216	
			75.75MC	5		A217	
			65.75MC	4		A218	
			59.75MC	3		A219	
			53.75MC	2		A220	

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

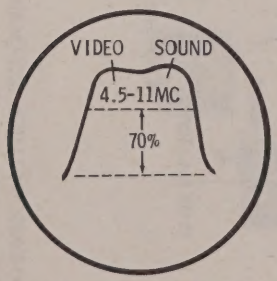
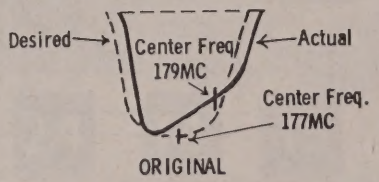


FIG.201



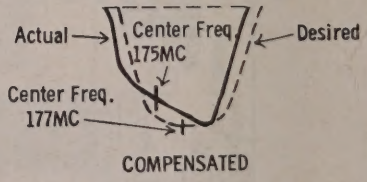
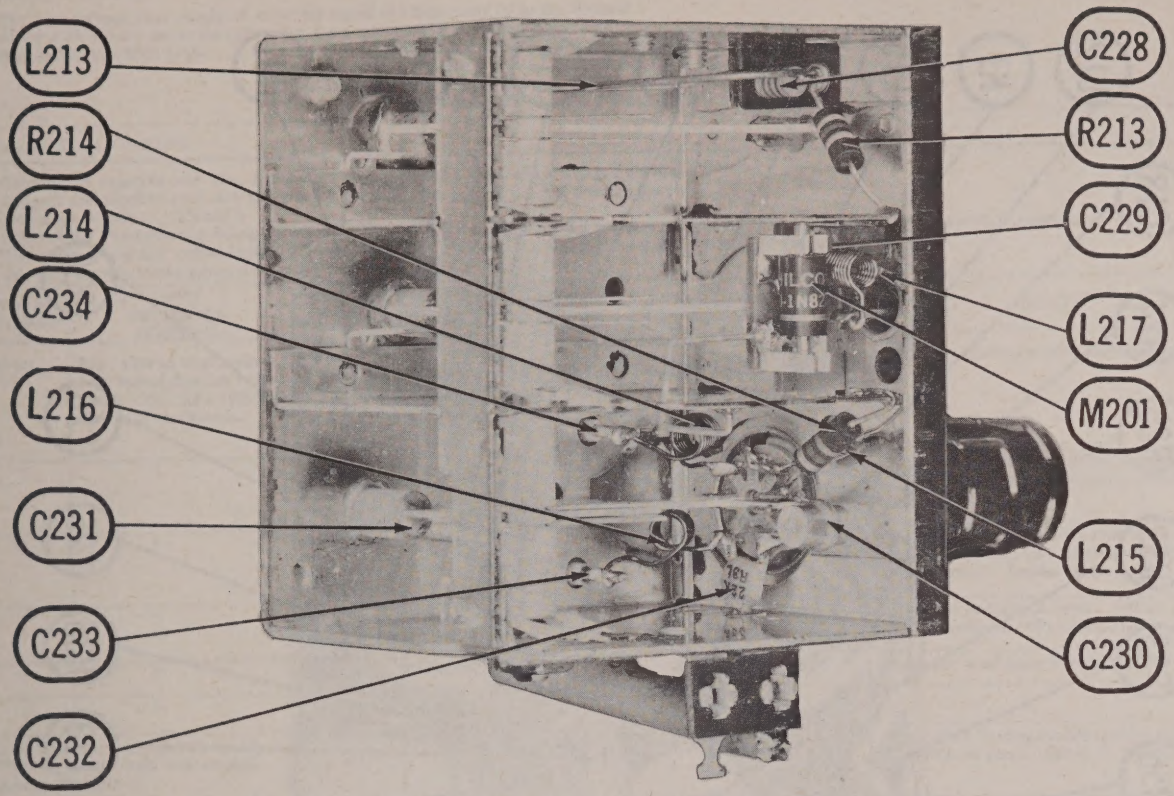
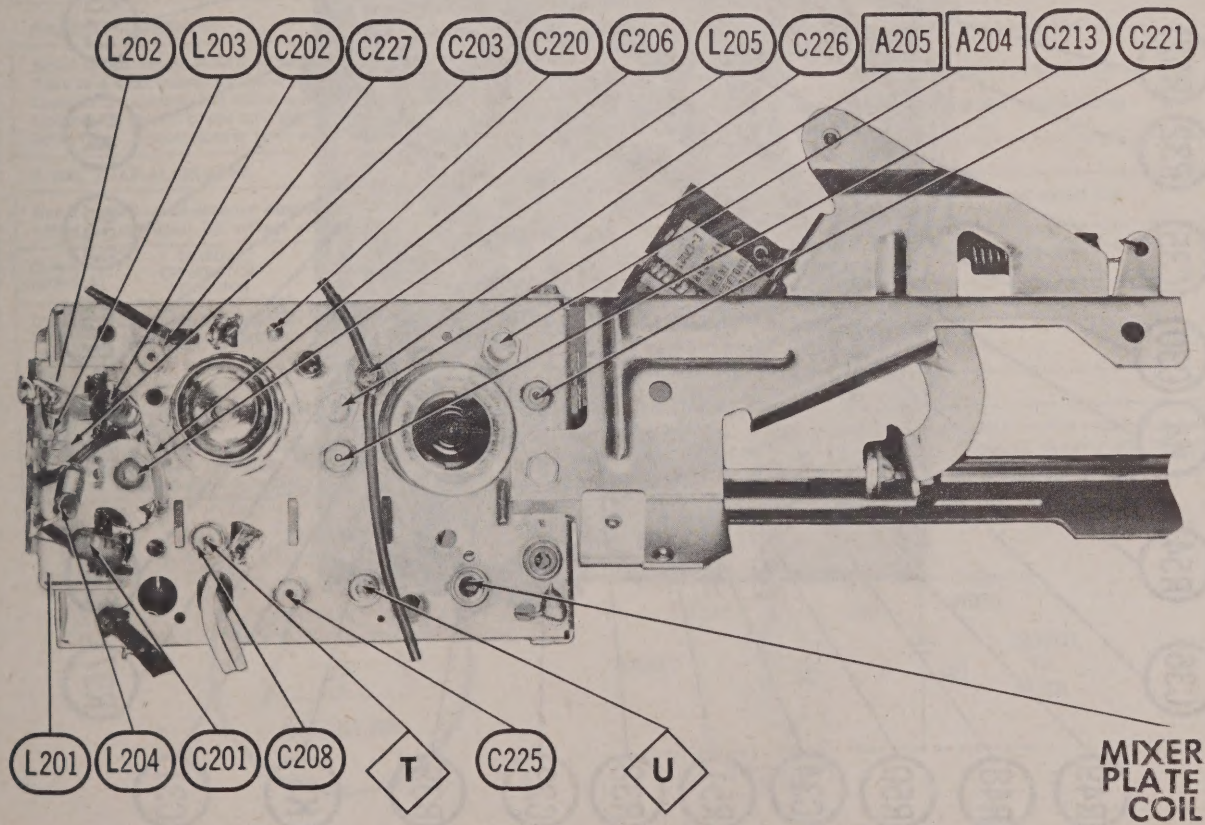


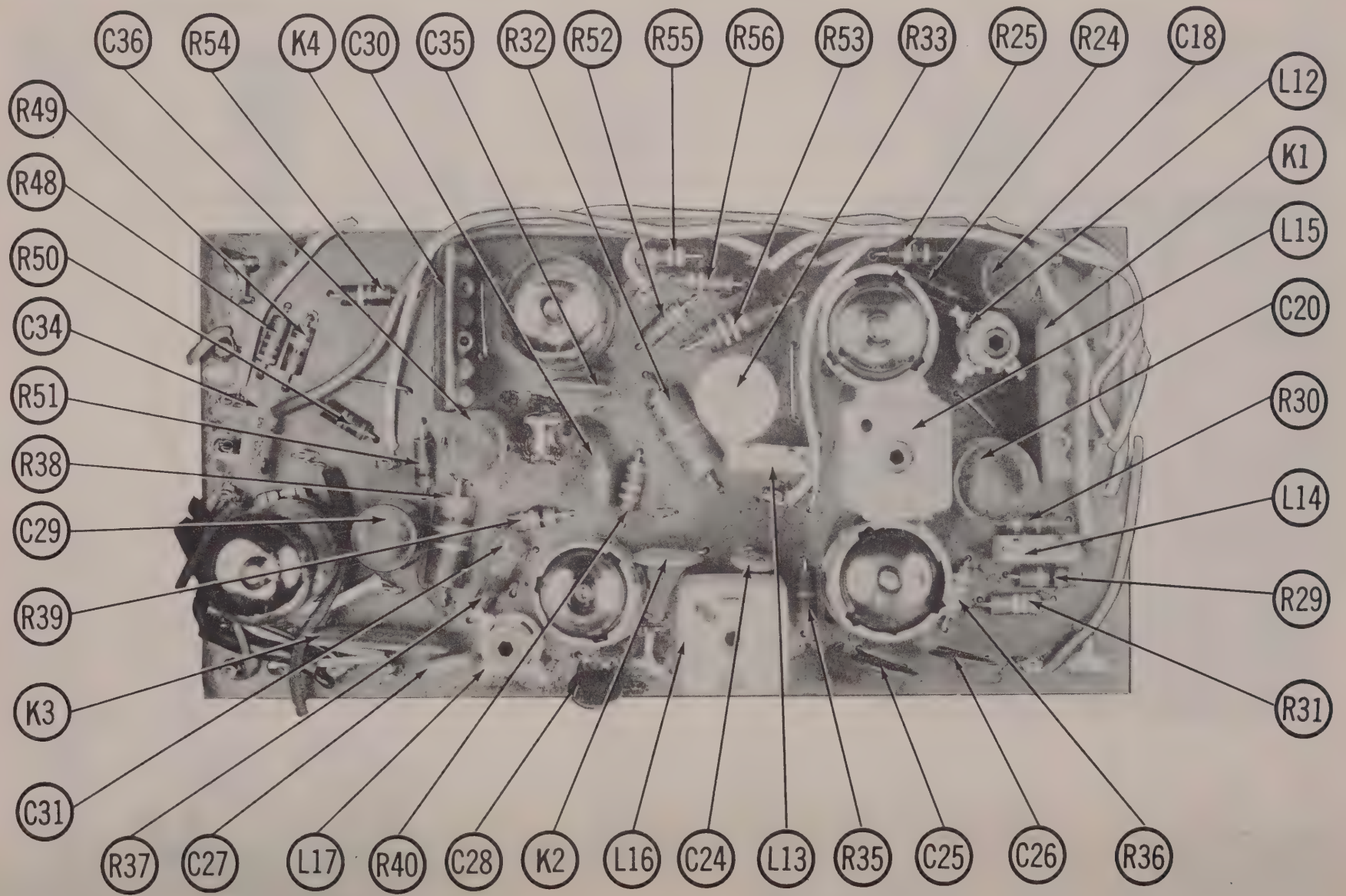
FIG.202



TUNER 76-10526 (T-28)



TUNER 76-10525-1 (T-101) - TOP VIEW



VIDEO, SYNC & SOUND PRINTED BOARD

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: A1 thru A4 .... General Cement #5000, 5003, 5014, 5015, 5016, 8276, 8290
Walsco #2512, 2515, 2522, 2523, 2525, 2537
A5 thru A13 .... General Cement #8606, 8606L, 8282, 9295
Walsco #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the negative lead of a 6 volt bias supply to point (A). Positive to chassis.
Connect the negative lead of a 2.5 volt bias supply to point (B). Positive to chassis.
Set Range switch to "Normal".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	Not used	45.75MC (400∿ 30% Mod)	Any non-interfering channel	Vert. Amp. thru 10K to point (C). Low side to chassis. (Across Video Det. load)	Mixer Plate Coil	Adjust for maximum 400∿ indication on scope.
2.	"	"	"	41.25MC	"	"	A1	Adjust for MINIMUM 400∿ indication on scope. Bias may be reduced as MINIMUM is approached.
3.	"	"	"	47.4MC	"	"	A2, A3	Adjust for MINIMUM 400∿ indication on scope. Bias may be reduced as MINIMUM is approached. Repeat steps 2 and 3.
4.	"	"	"	42.7MC	"	"	A4, A5	Reset bias to correct level. Adjust A4 and A5 for maximum 400∿ indication.
5.	"	"	"	45.0MC	"	"	A6	Adjust for maximum 400∿ indication.
6.	"	"	"	44.4MC	"	"	A7	"
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	"	65.75MC	4	"		Adjust Fine Tuning for MINIMUM 400∿ indication on scope. DO NOT CHANGE.
8.	"	"	69MC (10MC Swp)	67.25MC 70.5MC	"	"		Check for response similar to Fig. 1. If necessary, retouch Mixer Plate Coil to place 67.25MC marker at 50%. Position 70.5MC marker at 50% by retouching A5 and level top of curve with A7. DO NOT adjust A4 or A6.

SOUND IF ALIGNMENT

Sound IF Alignment should not be attempted until the Video IF has been properly aligned.
Tune in a weak station (antenna disconnected). Tune for best picture. DO NOT readjust Fine Tuning during remainder of alignment.
Connect the antenna and adjust A8 for maximum sound.
Connect VTVM DC probe thru 10K to point (D). Common to chassis. Disconnect antenna and adjust A9, A10 and A11 for maximum deflection. If intercarrier buzz or noise occurs, SLIGHTLY retouch A9, A10 and A11 to minimize the noise.

4.5MC TRAP ALIGNMENT

Use a 4.5MC tuned detector similar to Fig. 2. Before aligning trap, connect the detector to an accurate source of 4.5MC signal and adjust for maximum DC voltage output.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.001mfd	High side to point (C). Low side to chassis.	4.5MC (400∿ 30% AM)	Any non-interfering channel	DC probe thru detector probe (Fig. 2) to point (E). Common to chassis.	A12	Adjust for MINIMUM deflection on meter.

VIDEO PEAKING COIL ADJUSTMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field. If peaking coil (L12) is replace adjust A13 to the point where there is no smear or trailing whites in the picture. Check all channels and make compromise adjustment, if necessary.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 6

PHILCO PART #32-4449 OR EQUIVALENT

FIG. 1

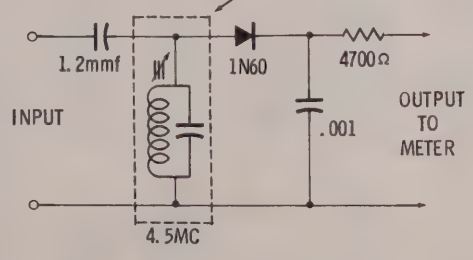


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF	6DE6	
V2	2nd Video IF	6DE6	
V3	3rd Video IF-Video Det	6AM8A	
V4	Video Output	12BV7	
V5	Sound IF-AGC Clamper	6BY8	
V6	Audio Det	6C96	
V7	Audio Output	6BQ5	
V8	Sync Sep -Noise Inv.	12AZ7	
V9	Vert. Mult.	6CG7	
V10	Vert. Output	6DT5	
V11	Horiz. Mult.	6CG7	
V12	Horiz Output	6DQ6A/ 6DQ6	
V13	Damper	5AUG4GT	
V14	HV Rect.	1G3GT	
V15	LV Rect.	5U4GB	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	PHILCO PART No	GENERAL ELECTRIC PART No	RCA PART No	SYLVANIA PART No	
V16	21FAP4			21EAP4	
	SF-21-A			SF-21-A ①	
	24AVP4			24AVP4/	
	SF-24-A			SF-24-A ①	

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP	VOLT	PHILCO PART No	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No
C1A	±40	350	30-2590-35	AFH4-53-90		FP459		Q-221. 2 MT-0225	TVL-4818
B	±10	350							
C	125	25							
D	±10	475							
C2A	±120	350	30-2590-34	AFH4-114-50	DD783. 6	FP330. 23 TC63		Q-075 MT-02100	TVL8-4823. 8*
B	±20	350							
C	±10	350							
D	50	25							

*Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.5-3		31-5536-1		829-3				
C4	.5-3		31-5535-1		829-3				
C5	1-6		31-5534-1		829-6				
C6	1-6		31-5535-2		829-6				
C7	2.5		30-1263-28	NPO-SL 2.5	TCZ-2R5	C10Y33C	CNO-533	5TCCB-V338 5%*	5%
C8	1000		30-1262-21	BPD-001	BD-102	BYAU01M	B-210	5HK-DI	
C9	680		30-1262-15	BPD-00068	DD-681	BYAU07S8	B-368	5GA-T68	
C10	470		30-1263-18	DM-470	MD-471	5R5T47	JL-347	5GA-T47S 10% *	10%
C11	1000		30-1262-11	BPD-001	BD-102	BYAU01M	B-210	5HK-DI	
C12	680		30-1262-15	BPD-00068	DD-681	BYAU07S8	B-368	5GA-T68	
C13	22		30-1263-1						N3300 10%
C14	1000		30-1262-11	BPD-001	DD-102	BYAU01M	B-210	5HK-DI	
C15	680		30-1262-15	BPD-00068	DD-681	BYAU07S8	B-368	5GA-T68	
C16	1000		30-1262-11	BPD-001	DD-102	BYAU01M	B-210	5HK-DI	
C17	5		30-1263	DE-5	DD-050	L10Y5	MC-306	5GA-Y5	
C18	.047	200	30-4684-38					28E-S47 S 10% *	10%
C19	.0033	400	30-4681-14	P488N-0033	DS-332	CUB6D33	GEM-5333	6TM-D33	
C20	.1	400	30-4684-47	P488N-1	DF-104	BC6PLJ	ACE401	6SE-P10	
C21	.15	200	30-4680-43	P288N-15		CUB2P15	GEM-3015	2TM-P15	
C22	10000		30-1263-2	BPD-01	DD-103	BYAU03M	B-310	5HK-SI	
C23	680		30-1263-22	BPD-00068	DD-681	BYAU07S8	B-368	5GA-T68	
C24	470		30-1262-16	BPD-00047	DD-471	BYAU07S7	B-347	5GA-T47	
C25	6800		30-1263-31	BPD-0068			B-382	2GHKD-D6	
C26	4700		30-1263-2	BPD-0047	DD-472	BYAU04M	B-347	5HK-D47	
C27	100		30-1256-11	BPD-001	DD-101	L10Y1	2HV-310	5GA-T1	
C28	7.5		30-1263-44					5TCUB-V75S *	N750
C29	.1	200	30-4684-30	P288N-1	DF-104	BC2PLJ	ACE401	2SE-P10	
C30	1500		30-1263-8	BPD-0015	DD-152	BYAU01S	B-315	5HK-DI5	
C31	1000		30-1263-15	BPD-001	DD-102	BYAU01M	B-310	5HK-DI	
C32	220		30-4650-61	NPO-SL 220	DE-221	L10T22	JL-322	5TCC-T22	10%
C33	.01	400	30-4650-42	P488N-01	DS-103	CUB4S	GEM-411	4TM-S1	
C34	4700		30-1263-3	BPD-0047	DD-472	BYAU04M	B-347	5HK-D47	
C35	1000		30-1263-13	BPD-001	DD-103	BYAU01M	B-310	5HK-DI	
C36	.1	200	30-4684-30	P288N-1		BC2PLJ	ACE401	2SE-P10	
C37	.01	400	30-4666-41	P488N-01	DS-103	CUB4S	GEM-411	4TM-S1	
C38	.0033	400	30-4681-14			1R5D33	GEM-16333	5DF-D33	10%
C39	680		30-1263-27	BPD-00068	DD-681	BYAU07S8	B-368	5GA-T68	
C40	18000		30-1263-28					5DF-S18	
C41	18	450	30-4684-48	P488N-25		BC9P15J	ACE6015	4SE-P15	
C42	.033	400	30-4684-44	P488N-033	DF-303	BC6S3J	ACE6133	4SE-S33	
C43	.1	400	30-4650-47	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C44	3300		30-1263-5	BPD-0033	DD-332	BYAU04D33	B-333	5HK-D33	
C45	.068	200	30-4650-46	P288N-068		CUB4S68	GEM-4168	4TM-S68	
C46	.0039	400	30-4651-25		D6-391			5DF-D39	10%
C47	390		30-1264-1	1469-00039		5R5T39		M3-339	10%
C48	56		30-1264-21	1469-000056	TCZ-56	22R5Q56	CNO-456	M3-456	10%
C49	.01	600	30-4686-41	P488N-01	DS-103	CUB4S	GEM-411	4TM-S1	
C50	.1	400	30-4684-47	P488N-1	DF-104	BC6PLJ	ACE401	4SE-P10	
C51	.022	600	30-4650-60	P688N-022		CUB6S22	GEM-6122	6TM-S22	
C52	330		30-1262-29	BPD-00033	DD-331	L10T33	B-333	5GA-T33	
C53	100	5000	30-1246-20	EVD-50-100	DD80-101	HVB50T1	6HV-310	50GAB-T1	①
C54	.047	600	30-4650-95	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C55	.1	200	30-4650-47	P288N-1	DF-104	CUB2P15	GEM-301	2TM-P1	

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
① 24" Models use 82mmf ② 5000V in this application (Part #30-1246-21).

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2 5meg		33-5592-31					Contrast
B	1meg							Volume, Taps ③ 50K & 500K
R2A	5meg		33-5693-17	B-87	A47-5meg-8	Q11-141	U87	Tone, Tap ③ 2. 5meg
B	Shaft			Not Req.	FS-3	Not Req	Not Req.	
R3A	100K		33-5593-18	B-60	A47-100K-S	Q11-138	U61	Brightness
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	30K		33-5593-19	B-26	A47-30K-S	Q11-121	U29	Horiz. Hold
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	2meg		33-5593-20	B-75	A47-2meg-S	Q11-139	U58	Vert. Hold
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R6	750Ω		33-5575-16					Vert. Lin.
R7A	75K		33-5596-1					Horiz. Range
B	2. 5meg							Height
R8	12. 5K	2(WW)	33-5596-1					Width

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PHILCO Part No.	NOTES
	OHMS	WATT		
R9	22K		66-3228340	
R10	1000Ω		66-2108340	
R11	2200Ω		66-2228340	
R12	330Ω		66-1338340	
R13	330Ω		66-1338340	
R14	47Ω		66-0478340	
R15	27K		66-2278340	
R16	330Ω		66-1338340	
R17	68Ω		66-0688340	
R18	15K		66-2158340	
R19	330Ω		66-1338340	
R20	220Ω		66-1228340	
R21	3meg		66-3308340	
R22	1. 2meg		66-5128340	
R23	18meg			Note 1
R24	150Ω		66-1158340	
R25	470K		66-4478340	
R26	68Ω		66-0688340	
R27	12K	4	33-1263-11	
R28	47K		66-3478340	Note 1
R29	100K		66-4108340	
R30	5600Ω		66-3568340	
R31	33K		66-3338340	
R32	1500Ω	2	66-2158340	
R33	3300Ω	7	33-3449-3	
R34	7Ω	7	33-1335-147	
R35	15K		66-3158340	
R36	330Ω		66-1338340	
R37	1500Ω		66-2158340	Note 2
R38	10K	2		Note 3
R39	10K	1	66-3104340	
R40	330Ω		66-1338340	
R41	47K		66-3478340	Note 4
R42	1000Ω	2	66-2108340	
R43	330Ω		66-1338340	
R44	4. 7meg		66-5478340	
R45	1. 5meg			Note 5

ITEM No.	RATING		PHILCO Part No.	NOTES
	OHMS	WATT		
R46	1meg		66-5108340	
R47	100K		66-4108340	
R48	82K 5%			Note 6
R49	200K 5%		66-4308340	
R50	15meg		66-5158340	
R51	1000Ω		66-2108340	
R52	4700Ω 5%		66-2478340	
R53	27K 5%	1	66-3278340	
R54	470K		66-4478340	
R55	4. 7meg		66-5478340	
R56	56K			Note 7
R57	6800Ω		66-3688340	
R58	27K			Note 8
R59	220K	1	66-4228340	
R60	560Ω 5%		66-1568340	
R61	820K			Note 9
R62	1. 5meg			Note 10
R63	1meg		66-5108340	
R64	180Ω	1	66-1182640	
R65	6. 8meg		66-5688340	
R66	56K	2	66-3568340	
R67	68K		66-3688340	
R68	15K	1	66-3154340	
R69	680Ω 5%			Note 11
R70	39K		66-3398340	
R71	3300Ω		66-2338340	
R72	500Ω	7	33-1263-22	
R73	100K	1	66-4104340	
R74	56K	2	66-3568340	
R75	1500Ω		66-2158340	
R76	1000Ω		66-2108340	
R77	1000Ω		66-2108340	
R78	560K		66-1568340	
R79	2000Ω	10	33-1263-5	
R80	1000Ω	2	66-2108340	
R81	470K		66-4478340	
R82	18. 6Ω		33-1345-10	

Note 1. Not used in some versions.
Note 2. Some versions may use 560Ω in this application (Part #66-1588240).
Note 3. Chassis stamped Sun 4 use 6800 2W in this application (Part #66-2685340).
Note 4. Some versions may use 33K in this application (Part #66-3338340).
Note 5. Some versions may use 4. 7meg in this application (Part #66-5478340).
Note 6. Some versions may use 33K in this application (Part #66-3338340).
Note 7. Some versions may use 330K in this application (Part #66-4228340).
Note 8. Some versions may use 33K in this application (Part #66-3338340).
Note 9. Some versions may use 1. 5meg in this application (Part #66-5158340).
Note 10. Some versions may use 3. 3meg in this application (Part #66-5338340).
Note 11. Some versions may use 1000Ω in this application (Part #66-1062640).

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		PHILCO Part No.	Meissner Part No.	Merit Part No.	Miller Part No.	Ram Part No.	
L1	47. 4MC Trap Coil	32-4643-32		19-1001	BC-562	4604	1. 5 Microhenries
L2	47. 4MC Trap Coil	32-4643-16		19-1002	BC-563	4606	2. 8 Microhenries
L3	41. 25MC Trap Coil	32-4643-34					
L4	RF Choke	32-4643-30			4594		. 33 Microhenry
L5	1st Video IF	32-4643-33		19-3001	TV-189	4594	. 68 Microhenry
L6	2nd Video IF	32-4686-2					
L7	3rd Video IF	32-4686-3					
L8	Fil. Choke	32-4646-35					
L9	4th Video IF	32-4686-3					
L10	RF Choke	32-4674-1		19-8022	TV-192	6152	33 Microhenries
L11	Resonant Choke	32-4646-7					3 Microhenries
L12	Shunt Peaking Coil	32-4694-11					Variable, 200-600 Microhenries
L13	Shunt Peaking Coil	32-4762-13		19-3500	TV-203	6188	VP-8 470 Microhenries
L14	Series Peaking Coil	32-4762-8		19-4201	TV-197	6154	200 Microhenries
L15	1st Sound IF	32-4688-6					
L16	2nd Sound IF	32-4745-2					
L17	Quadrature Coil	32-4644-14					
L18	Resonant Choke	32-4112-80					
L19	Resonant Choke	32-4112-60					

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES		REPLACEMENT DATA					NOTES
	PRI.	SEC.	PHILCO Part No.	Meissner Part No.	Merit Part No.	Miller Part No.	Ram Part No.	Thordarson Part No.	
L20	148Ω		32-4754-2						Horiz. Freq.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (@ CURRENT 1000 ^(-1))	PHILCO Part No.	Halldorson Part No	Merit Part No	Ram Part No.	Stancor Part No	Thordarson Part No.	Triad Part No
L21	290A	41Ω	1. 3 Hy	32-8710-5					26C44	C-23X

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2		PHILCO Part No.	Halldorson Part No.	Merit Part No.	Ram Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No
T1	117V	580VCT @ 2A	5V @ 3A		32-8845-1						
	SEC 3	SEC 4	SEC 5								
	6. 3V @ 10. 1A										

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		PHILCO Part No.	Halldorson Part No.	Merit Part No	Ram Part No.	Rogers Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No
T2	Vert. Output	32-8852-1	Z1900 ①						A-108X
	Alt. Vert. Output	32-8839-1	Z1900 ①						A-108X
T3	Yoke-Horiz. (25MH)	76-10508-4 ②						Y-53 ④	
	(110^2)-Vert. (190MH)								
	Alt. Yoke	76-10508-5③							
	Rear Cover & Centering Device Assy. & Clamp	76-10513-2 ②							
	Rear Cover & Centering Device Assy.	76-10304-1 ③							
T4	Horiz. Output	32-8840-1							

① Use 8 : 1 turns ratio. ③ Used in 21" sets. ④ Used in 24" sets.
② Remove jumper between terminal #1i and #7. Parallel 2"mmf across terminal #1i and #2 with approximately 100mmf ⑤ 4000V. Use original rear cover and centering device assy. Connect same as original.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	PHILCO Part No.	Halldorson Part No.	Merit Part No.	Ram Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No
T5	9800Ω	3-4Ω	32-8825-2	Z1117	A-2992	AU-608	A-3879	24S52	S-17X

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V C. IMP.	PHILCO Part No.	QUAM Part No.	
SP1	6" x 9"	PM	10Ω	36-1679-3 ①	69A2210 ①	① Parallel and phase.
SP2	5 1/4"	PM	9Ω	36-1689-10 ①	52A2129 ①	
SP3	5 1/4"	PM	9Ω	36-1689-10 ①	52A2129 ①	

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	PHILCO PART No	REPLACEMENT DATA	
K1	Video Det. Output	1000mmf, 820K, 3900Ω, 3. 3meg, 8. 8meg	30-6518-3 ①		
K3	Audio Det. Coupling	150mmf, 15K	30-6031-1	Sprague	AC15-5
K3	Audio Det. Output	470mmf, 100mmf, 820K, 2. 7meg	30-6033-2		
K4	Sync Coupling	470mmf, 3900mmf, 22K, 100K, 220K, 1. 5meg	30-6517-3 ②		
K5	Vert. Integrator	4000mmf, 10000mmf, 10000mmf, 10K, 10K, 10K, 1meg	30-6008-2	Centralab Sprague	PC-306 V-5
K6	Horiz. AFC	82mmf, 100mmf, 100mmf, 2000mmf, 2000mmf, 100K, 1meg, 1meg	30-6033-2 ②		
K7	Horiz. Mult. Output	560mmf, 4700mmf, 8800Ω, 15K, 39K, 1meg	30-6516-2		
K8	Vert. Retrace	2000mmf, 5000mmf, 10K, 1meg	30-6024-2		

① Part #30-6516-2 may be used in some versions.
② Alternate part number used in early production.
③ Part #30-6033-1 may be used in some versions. Manufacturer states to replace with 30-6033-2.

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	PHILCO PART No	FEDERAL PART No	GENERAL ELECTRIC PART No	INTERNATIONAL PART No	SARKES TARZIAN PART No	
M1		34-8037-1 ①	K615 1		SD-91 ②		① Selenium Type. ② Silicon Type (2 used)

PHILCO CHASSIS 9L60, U

FOLDER 1

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PHILCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	N	7/10A 250V S/B	27-6318-1	27-6317-6	333.600 (N-6/10A-125V-S/B)	346010	N 7/10	HN 1/2 to 3/4
M3	1" Length of #24 Copper Wire							
M4	1/2" Length of #27 Copper Wire							

MISCELLANEOUS

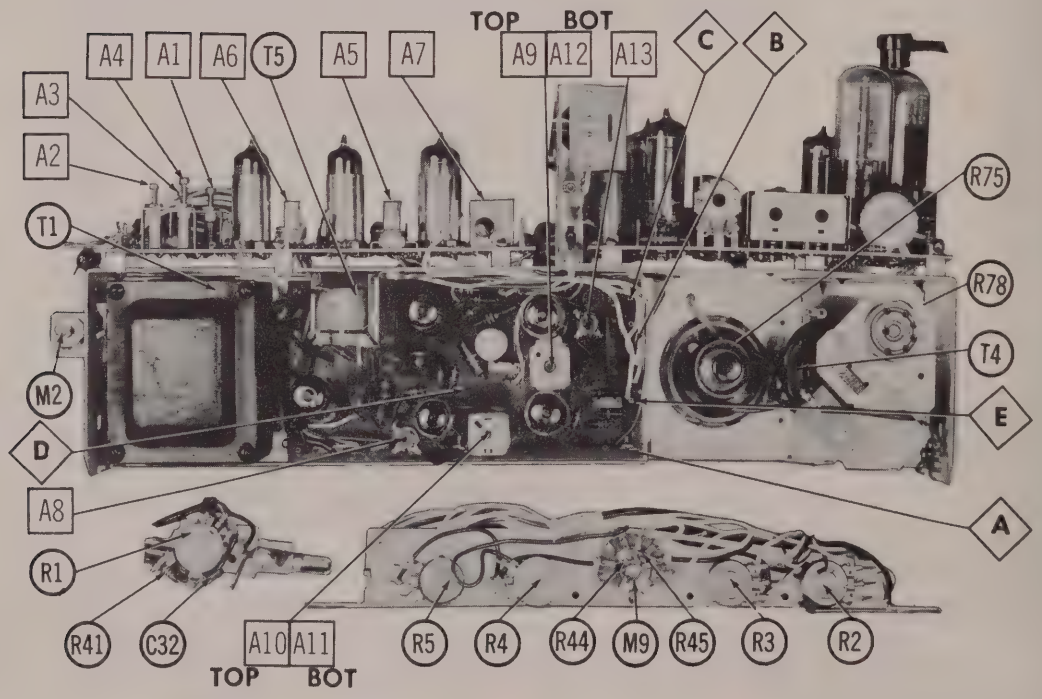
ITEM No.	PART NAME	PHILCO PART No.	NOTES
M5	Lamp	34-2031-4	#1847
M6	Lamp	34-2031-4	#1847
M7	Tuner	76-10525-1	(T-101) VHF with UHF Provisions, Ch. 9L60U
	Tuner	76-10524-1	(T-100) VHF, Ch. 9L60
M8	Tuner	76-10526	(T-28) UHF, Ch. 9L60U
M9	Switch	42-2063-3	Range (3 Position, Rotary, Wafer Type)
M10	Switch	42-2088	On-Off (SPST Spring Return Slide Type)
	Magnet	76-10531-1	Beam Alignment used with some tubes
	Printed Board	54-6655	Video IF
	Printed Board	54-6579	Video, Sync & Sound (Specify color of paint dot)
	Printed Board	54-6578	Sweep

CABINETS & CABINET PARTS

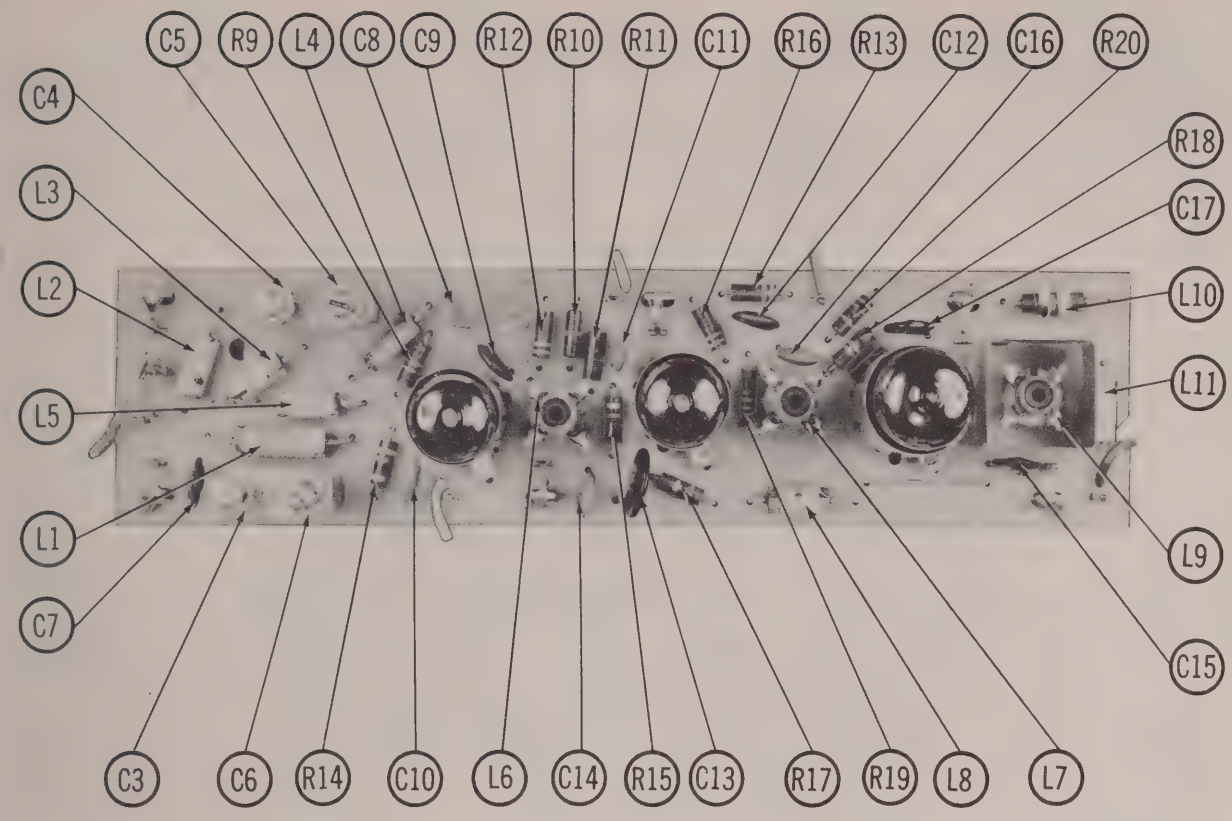
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

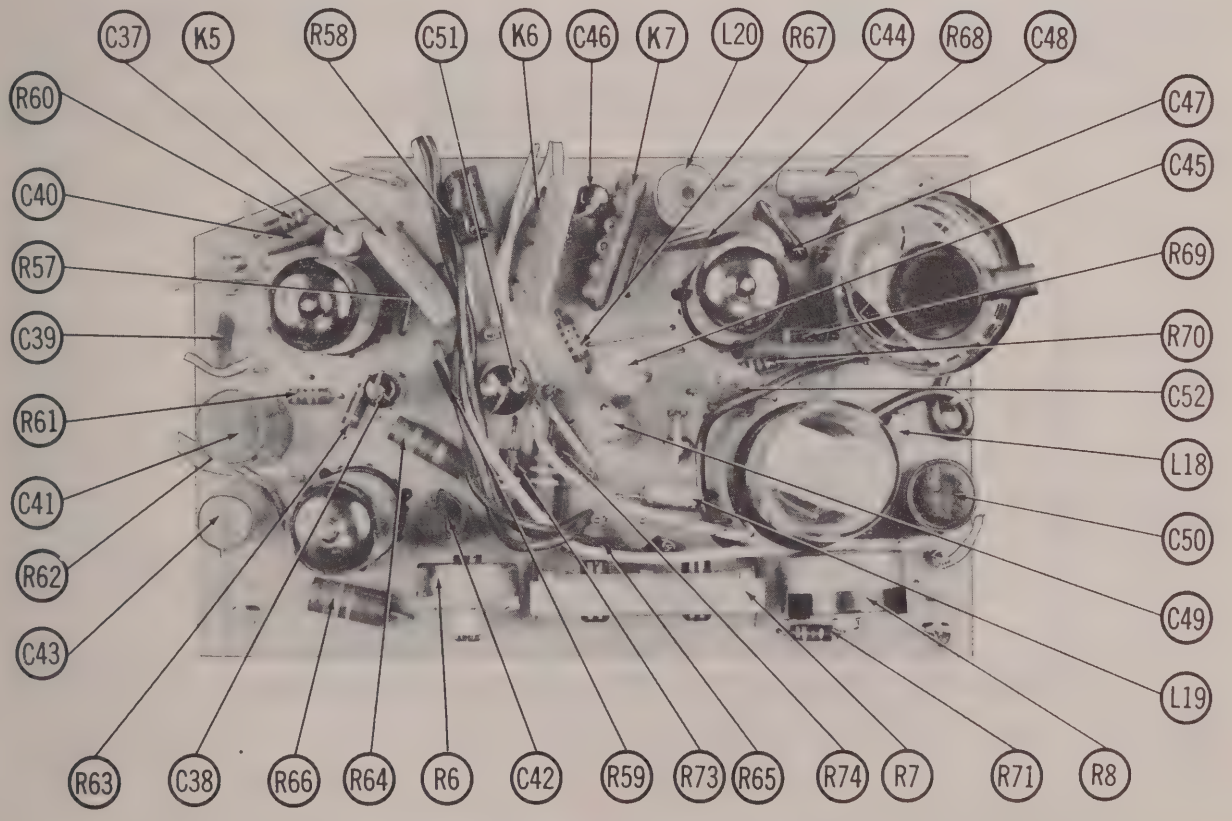
High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor)
		8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors
		8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor
		8485 (Round) - 5 Conductor
		8488 (Round) - 8 Conductor



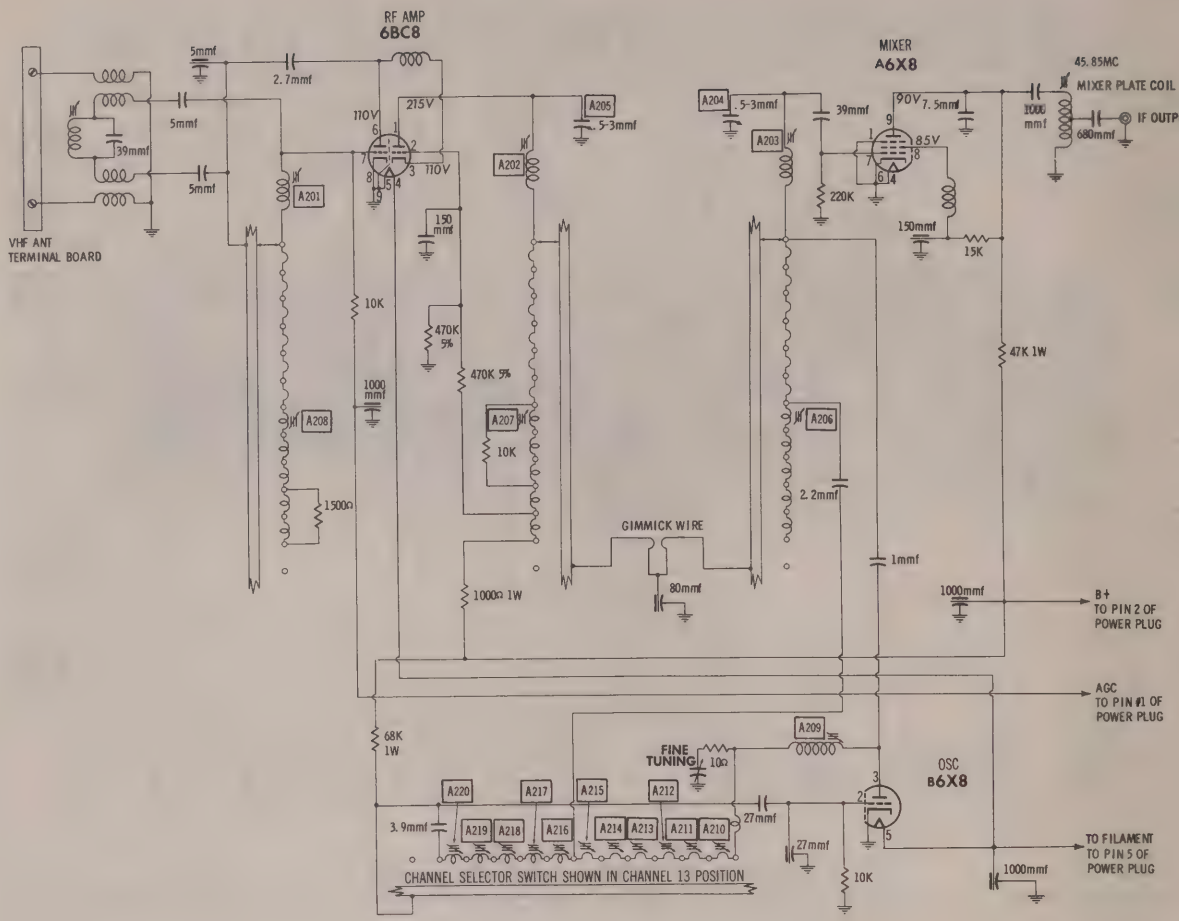
CHASSIS—REAR VIEW



VIDEO IF PRINTED BOARD



SWEEP PRINTED BOARD



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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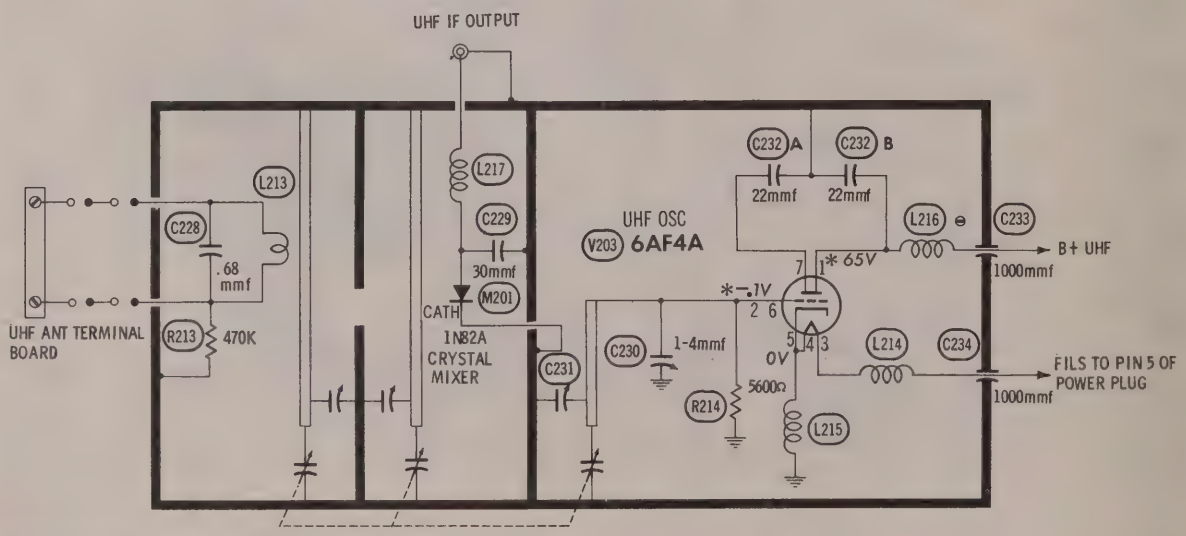
VHF TUNER 76-10524-1 (T-100)



* MEASURED IN UHF POSITION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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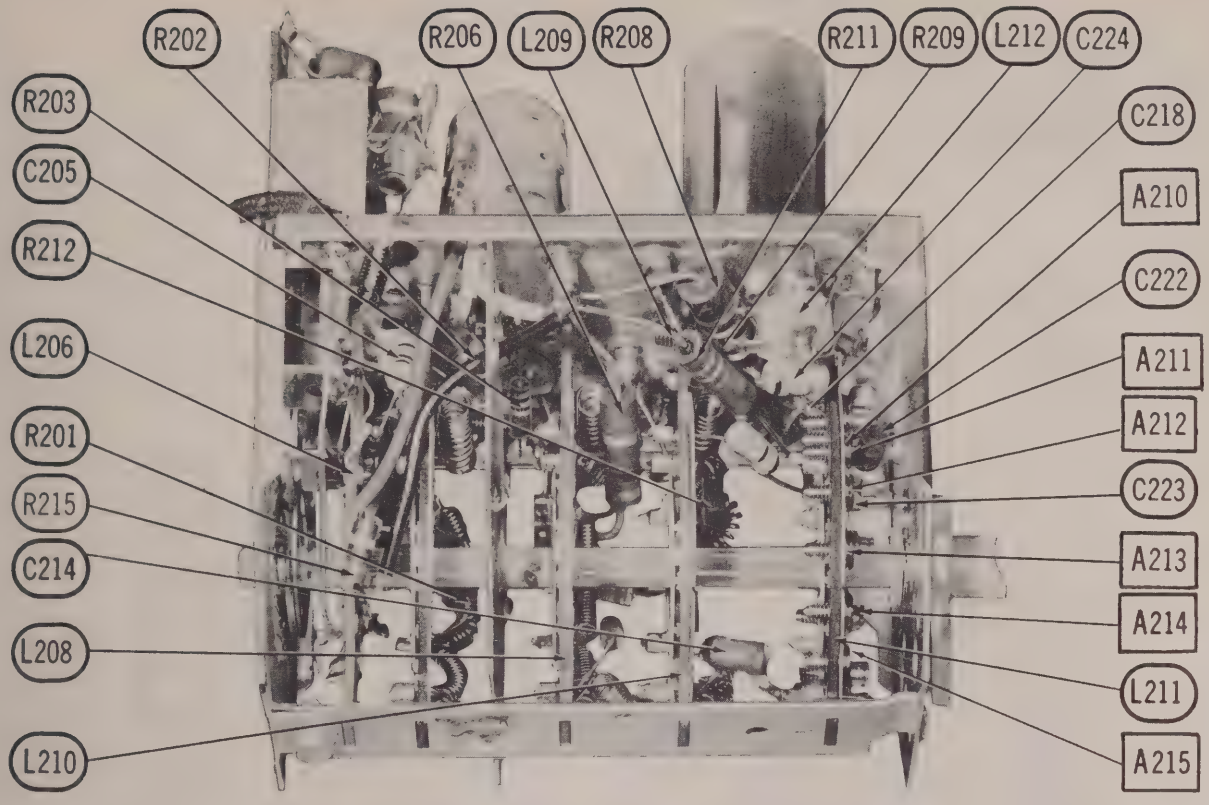
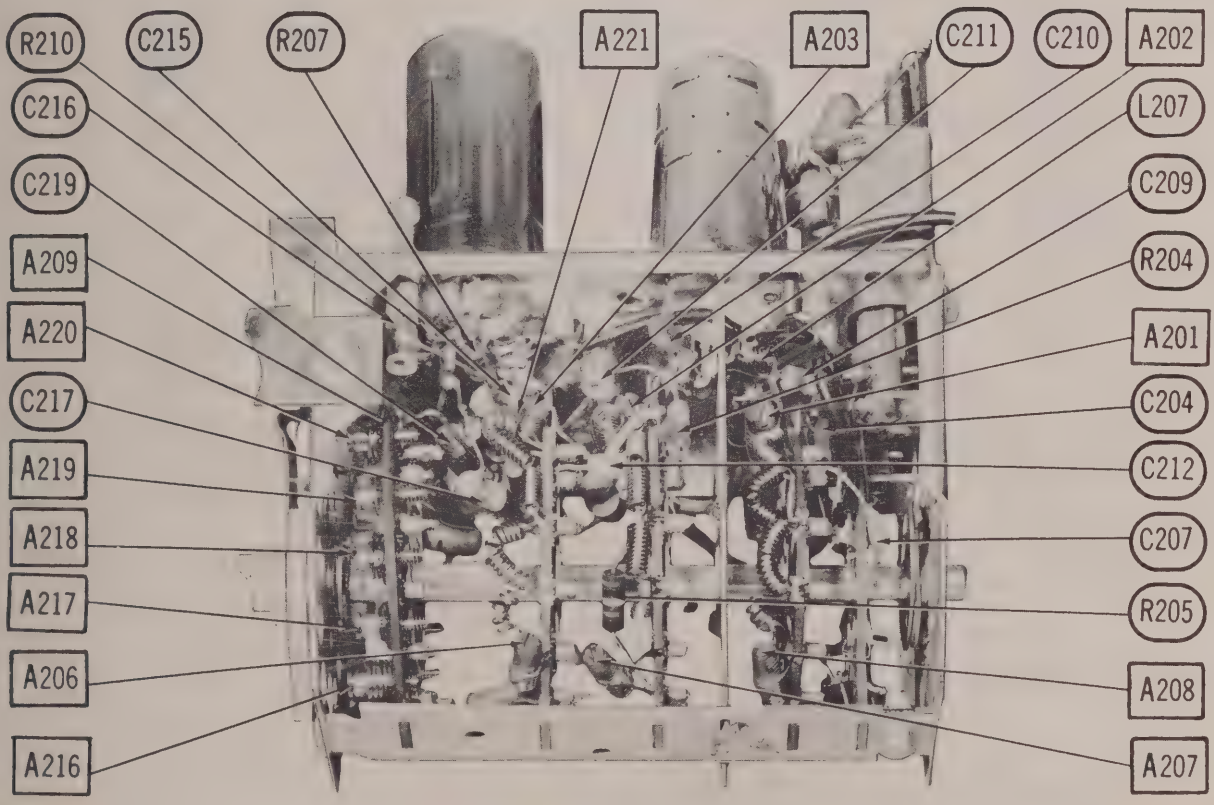
UHF TUNER 76-10526(T-28)



TUNER 76-10525-1 (T-101) - LEFT SIDE



TUNER 76-10525-1 (T-101) - RIGHT SIDE

TUNER PARTS LIST AND DESCRIPTIONS

76-10525-1 (T-101), 76-10526 (T-28)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BC8	
V202	Mixer-Osc.	6X8	

ITEM No.	USE	TYPE	NOTES
V203	UHF Osc.	6AF4A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	5		30-1224-78						NPO ±.25mmf
C202	5		30-1224-78						NPO ±.25mmf
C203	39		30-1251-21	NPO-SI 39	DTZ-39	L10Q39	CNO-439	5TCC-Q39	NPO 10%
C204	5		30-1224-78						NPO ±.25mmf
C205	5		30-1224-78	SI 5	D6-050	LT6V5	ZT-555		
C206	5		30-1268-1						10%
C207	330		30-1238-24	DI-00033	DD-331	L10T33	B-333	5GA-T33	
C208	1000		30-1268-7	EF-001	MFT-1000			503C-D1	
C209	2.7		30-1221-18						10%
C210	150		30-1265	DI-00015	DD-151	L10T15	B-153	5GA-T15	
C211	.5-3.0		31-6520-1		829-3		CT565A		
C212	3.9		30-1221-14						10%
C213	80		30-1268-13						±5mmf
C214	2.2		30-1221-6	SI 2.2	TCZ-2R2			5TCCB-V22	
C215	39		30-1251-21	NPO-SI 39	TCZ-39	L10Q39	CNO-439	5TCC-Q39	NPO 10%
C216	.5-3.0		31-6520-25		829-3		CT565A		
C217	1		30-1224-82					5TCCB-V1	±.1mmf
C218	7.5		30-1251-19		DD-7R5				±.5mmf
C219	1000		30-1238-13	DI-001	DD-102	L10D1	B-210	5GA-D1	
C220	150		30-1268-6						
C221	27		30-1268-4						10%
C222	27		30-1224-146	NPO-SI 27	TCZ-27	C10Q27C	UC-5427		NPO
C223	3.9		30-1221-14						10%
C224	680		62-168001011	SI 680	D6-681	LT6T68	UC-5368	5GA-T68	
C225	1000		30-1268-7	EF-001	MFT-1000			503C-D1	
C226	1000		30-1268-7	EF-001	MFT-1000			503C-D1	
C227	1000		30-1268-7	EF-001	MFT-1000			503C-D1	
C228	.68		30-1221-11	NPO-SI .68	TCZ-R68				
C229	30		76-10612						
C230	1-4		31-6520		829-4		CT551		
C231			3W12354						
C232	22		30-1275-2	DI-000022	DD-220	L10Q22	CNO-422	5GA-Q22	
C233	1000		30-1258	EF-001	MFT-1000			503C-D1	
C234	1000		30-1258	EF-001	MFT-1000			503C-D1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R201	1500Ω		66-2158340	
R202	10K		66-3108340	
R203	470K 5%		66-4478240	
R204	470K 5%		66-4478240	
R205	10K		66-3108340	
R206	1000Ω	1	66-2104340	
R207	220K		66-4228340	
R208	47K	2	66-3475340	

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R209	15K		66-3158340	
R210	10K		66-3108340	
R211	68K	1	66-3684340	
R212	220Ω		66-1228340	
R213	470K		66-4478340	
R214	5600Ω		66-2568340	
R215	150K		66-4158340	

COILS (RF-IF)

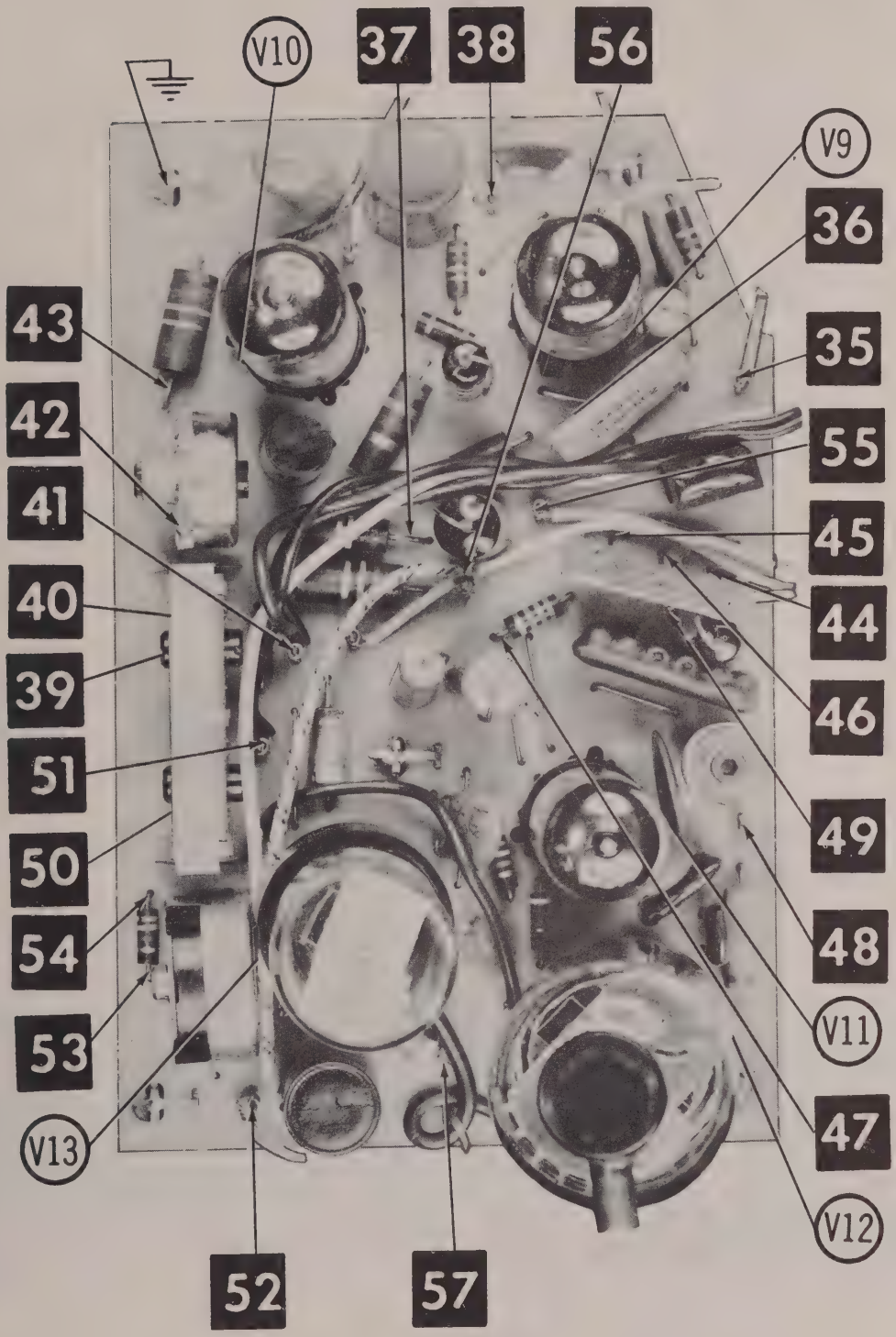
ITEM No.	USE	PHILCO PART No.	NOTES
L201	VHF Ant. Trans.	32-4725-3	
L202	VHF Ant. Trans.	32-4725-3	
L203	IF Trap Coil	32-4645-31	
L204	IF Trap Coil	32-4645-31	
L205	IF Trap	32-4719-2	
L206	Ant. Coils	76-10600	Channel 2-13 Includes wafer assy.
L207	RF Choke	32-4652-52	
L208	RF Coils	76-10601	Channel 2-13 Includes wafer assy.
L209	RF Choke	32-4652-48	

ITEM No.	USE	PHILCO PART No.	NOTES
L210	Mixer Grid Coils	76-10602	Channel 2-13, Includes wafer assy.
L211	Osc. Coils	76-10108	Channel 2-13 Includes wafer assy.
L212	Mixer Plate	32-4629-10	
L213	UHF Ant.	76-10072	Includes terminal assy.
L214	Fil. Choke	32-4652-44	
L215	Cathode Choke	32-4642-4	
L216	RF Choke	32-4652-44	Note 1
L217	RF Choke	76-10612	Part of Panel Assy.

Note 1. Early production used a 1000Ω resistor in this application. Replace with coil.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		PHILCO PART No.	CBS PART No.	SYLVANIA PART No.	
M201	1N82A	34-8027	1N82A	1N82A	UHF Mixer (Clip-in)



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SWEEP PRINTED BOARD

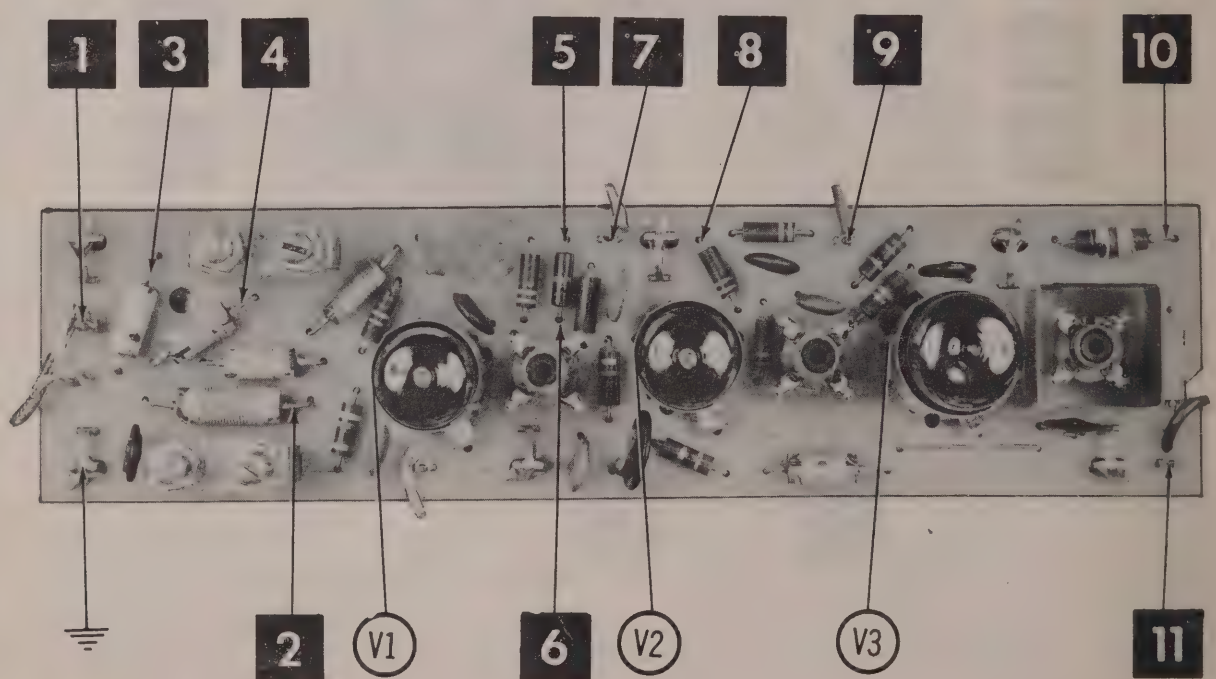
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6DE6	1.3meg	47Ω	0Ω	.1Ω	†2600Ω	†2600Ω	0Ω		
V2	6DE6	1.3meg	68Ω	0Ω	.1Ω	†2600Ω	†2600Ω	0Ω		
V3	6AM8A	220Ω	.1Ω	†3000Ω	.1Ω	0Ω	†3000Ω	.2Ω	3900Ω	0Ω
V4	12BV7	68Ω	470K	0Ω	0Ω	0Ω	.1Ω	†4800Ω	†2000Ω	0Ω
V5	6BY8	5.2Ω	0Ω	0Ω	.1Ω	0Ω	580K	†17K	†17K	330Ω
V6	6CS6	15K	330Ω	.1Ω	0Ω	‡800K	†9500Ω	5Ω		
V7	6BQ5	0Ω	0Ω	330Ω	0Ω	.1Ω	NC	†1500Ω	TP	†1000Ω
V8	12AZ7	†100K	3meg	4700Ω	.1Ω	.1Ω	†30K	1.5meg	0Ω	0Ω
V9	6CG7	‡280K	1meg	560Ω	0Ω	.1Ω	•‡2.5meg	•2.3meg	560Ω	0Ω
V10	6DT5	†0Ω	NC	1meg	0Ω	.1Ω	1meg	• 580Ω	NC	†380Ω
V11	6CG7	†16K	2.1meg	910Ω	.1Ω	0Ω	†45K	•80K	910Ω	0Ω
V12	6DQ6A 6DQ6	NC	0Ω	NC	•†16K	1meg	NC	.1Ω	0Ω	TOP CAP ‡15Ω
V13	6AU4GT	NC	NC	¶180K	NC	†2Ω	NC	.1Ω	0Ω	
V14	1G3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡395Ω
V15	5U4GB	NC	¶	NC	26Ω	NC	27Ω	NC	¶	
V16	21EAP4 SF-21-A	0Ω	NC	1meg	‡100K	NC	‡100K	133K	.1Ω	
V201	6BC8	†2000Ω	280K	INF	.1Ω	0Ω	INF	3.5meg	0Ω	0Ω
V202	6X8	0Ω	10K	†69K	0Ω	.1Ω	0Ω	220K	†63K	†48K
V203	6AF4A	†•13K	5600Ω	.2Ω	.1Ω	.1Ω	5600Ω	†•13K		
ITEM	TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 270V SOURCE.
‡ MEASURED FROM PIN 3 OF V13. NC NO CONNECTION
• MEASURED IN "UHF" POSITION. TP TIE POINT

CircuiTrace Numbers 1 thru 11



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VIDEO IF PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26

MODEL B225EUD (CH 17B20UD)

ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26

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PHOTOFACT* Folder
*TRADE MARK

ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26

ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 10 front push-on type knobs.
2. Remove 6 wood screws holding rear cover. Remove rear cover.
3. Remove tuner and speaker leads.
4. Remove 2 metal screws holding UHF Tuner and 2 metal screws holding VHF Tuner to rear of cabinet.
5. Remove UHF and VHF Tuners.
6. Locate shaft drive, On-Off-Volume control located on UHF tuner bracket. Loosen rear screw on nylon coupling bushing, slide shaft forward, remove "C" washer holding control to bracket, slide rubber grommet from shaft and remove control from bracket.
7. Remove 4 bottom chassis bolts.
8. Remove chassis.

MODEL B2225EUD (CH 17B20UD)

TRADE NAME	Zenith	MODELS	CHASSIS
		B2221R, Y, B2223E, R, B2225, E, R, B2245, E, R, B2246E, R, B2247E, R, B2249, H, R, B2254E, H, B2673, E, R	17B20
		B3001E, R, B3006, E, R, B3007E, R, B3008R, B3009, E, Y	17B20Q
		B2221RU, YU, B2223EU, RU, B2225EU, RU, U, B2245EU, RU, U, B2246EU, RU, B2247EU, RU, B2249HU, RU, U, B2254EU, HU, B2673EU, RU, U	17B20U
		B2221RUD, YUD, B2223EUD, RUD, B2225EUD, RUD, UD, B2245EUD, RUD, UD, B2246EUD, RUD, B2247EUD, RUD, B2249HUD, RUD, UD, B2254EUD, HUD, B2673EUD, RUD, UD	17B20UD
		B3000E, R, B3004, E, R	17B21Q
		B2282, E, R	17B22 & 5B26
		B2282EU, RU, U	17B22U & 5B26
		B2282EUD, RUD, UD	17B22UD & 5B26
		Remote Control Chassis	S-43722, S-43724, S-43894

MANUFACTURER	Zenith Radio Corp., 6001 Dickens Avenue, Chicago 39, Illinois
TUBES	TV-Seventeen (VHF), Eighteen (UHF); Amplifier - Five
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 200 Watts, 1.75 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. The adjustments are accessible, one at a time, as the Channel Selector is rotated. Adjust for best picture and sound.

SAFETY GLASS REMOVAL

Remove 4 Channel Selector and On-Off Volume push-on type knobs from the front. Remove 4 metal screws now visible holding knob escutcheons. Remove safety glass.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Focus
The focus may be varied by means of a Focus control. (For location, see tube placement chart.)

C. Fringe Lock
Adjust picture to lock in with hold controls. If picture jitters, tears, etc. adjust Fringe Lock until stable. Readjust the hold controls and check operation on all channels in the area.

D. Width
The Width may be varied by means of a metallic sleeve located between the yoke and the picture tube neck. Adjust sleeve in or out of the yoke for a picture slightly larger than necessary to fill the screen.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency coil is used as the Horizontal Hold control. Adjust the Horizontal Hold until the picture synchronizes horizontally. (For location, see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Buzz control for MINIMUM buzz and maximum sound. (For location, see tube placement chart.)

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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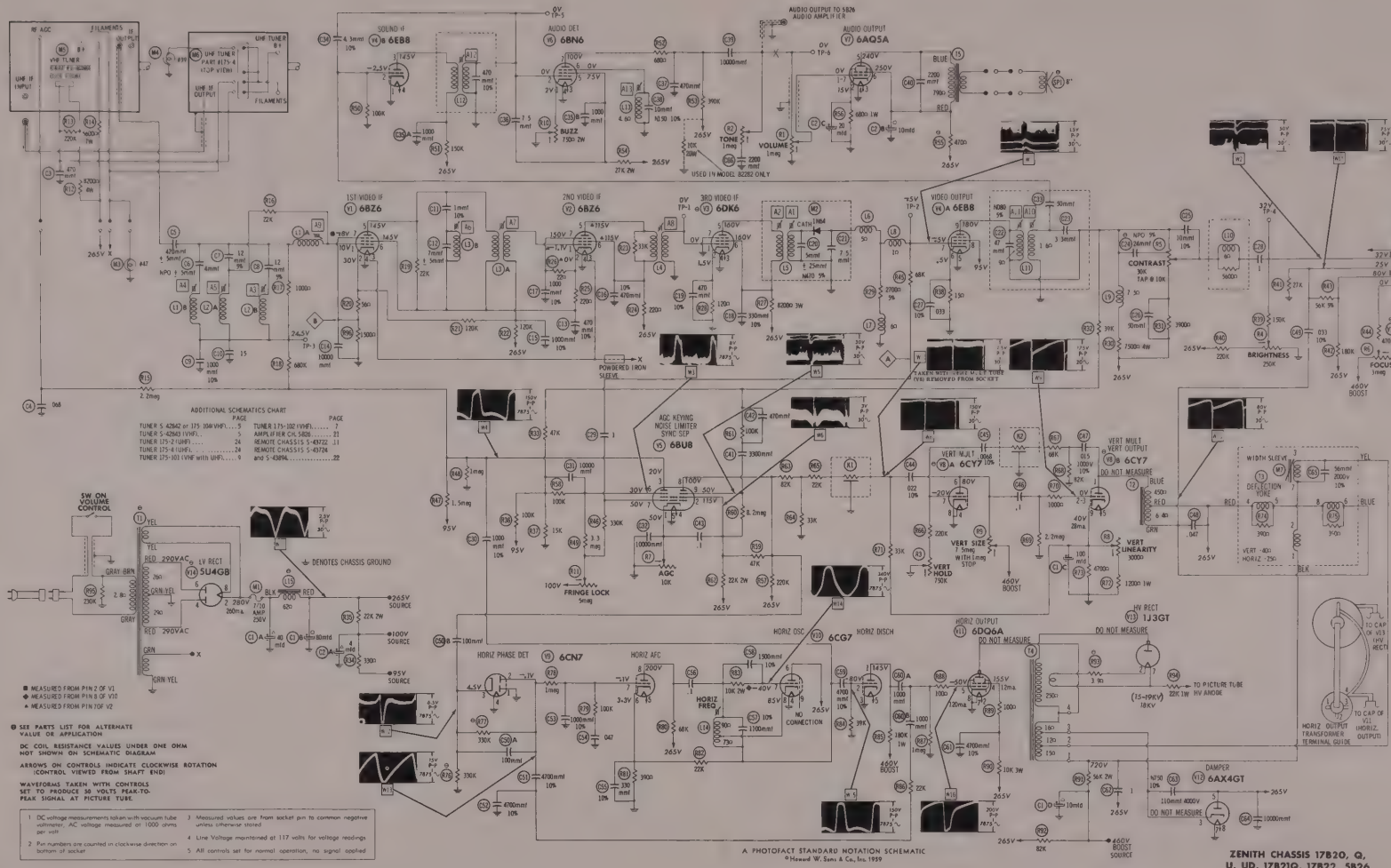
H957

SET 429 FOLDER 2


ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26
ADDITIONAL SCHEMATICS CHART
PAGE
TUNER S-42842 or 175-104 (VHF)... 5
TUNER S-42843 (VHF)... 5
TUNER 175-2 (VHF)... 24
TUNER 175-4 (UHF)... 24
TUNER 175-101 (VHF with UHF)... 9
TUNER 175-102 (VHF)... 7
AMPLIFIER CH. 5B26... 21
REMOTE CHASSIS S-43722... 11
REMOTE CHASSIS S-43724 and S-43894... 22
DENOTES CHASSIS GROUND
MEASURED FROM PIN 2 OF V1
MEASURED FROM PIN 8 OF V10
MEASURED FROM PIN 7 OF V2
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1 DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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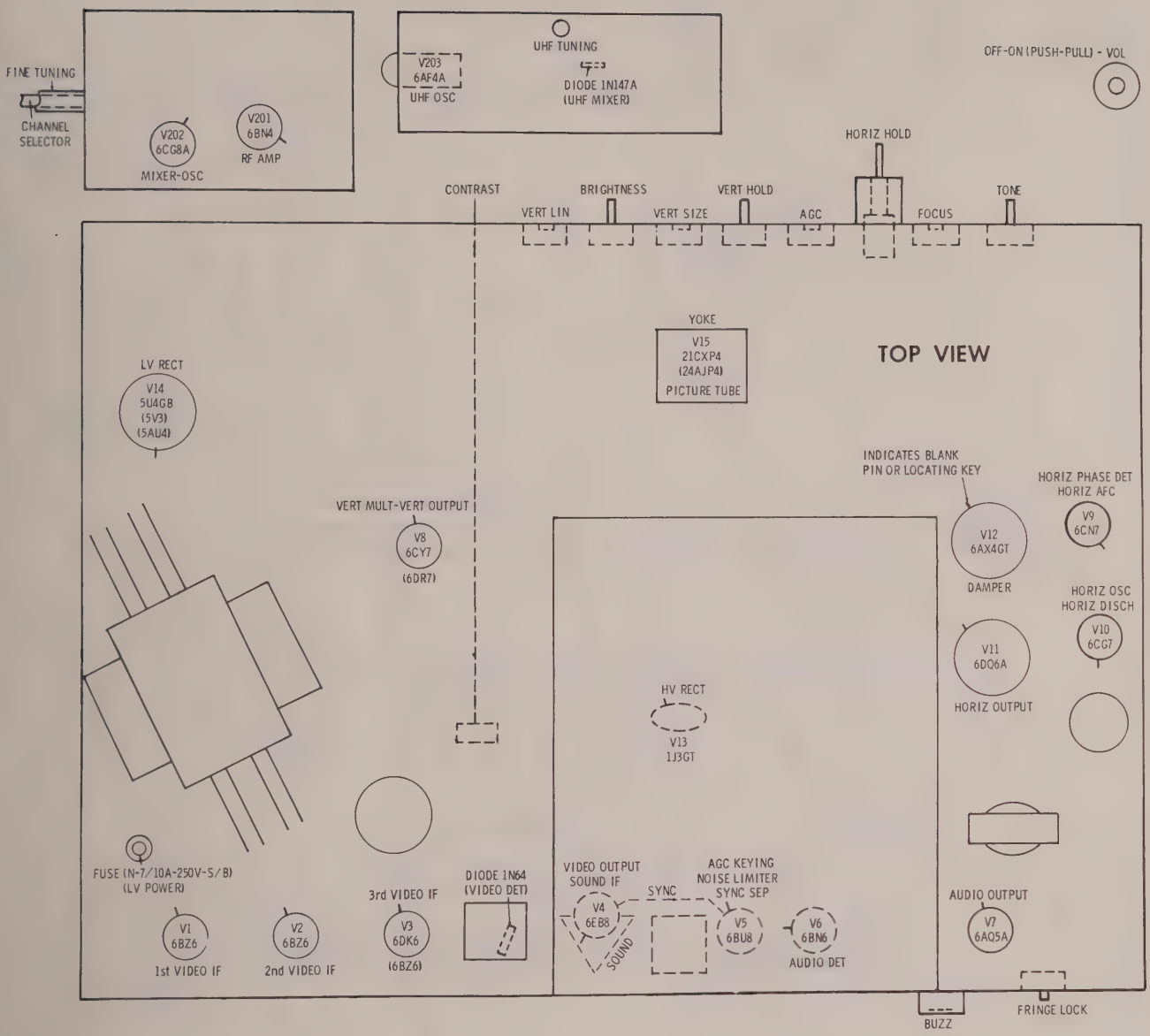
ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound Fuse (7/10A), V14

SWEEP FAILURE
No raster, has sound V9, V10, V11, V12, V13, V15
No vertical deflection V8
Poor vert. linearity or foldover V8
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, V14
Vert. off freq. V8
Horiz. off freq. V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.), V4
No pic, no sound, has snow V201, V202, V1, V203, UHF Mixer Diode (UHF only)
No pic, has sound, has raster V4, V15
Has pic, no sound V4, V6, V7
Overloaded picture V5

SYNC FAILURE
No vert. sync V5
No horiz. sync V5, V9
No vert. or horiz. sync V5

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: A1 thru A13. . . . General Cement #8606, 8606L, 8682, 9295
Walsco #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470mmf	High side to TP1. Low side to chassis. Connect a 56Ω carbon resistor across sweep output.	44MC (10MC Swp)	39.75MC 41.25MC 45.75MC	Between any two channels	Vert. Amp. thru 10K to TP2. Low side to chassis. (Across Video Det. load)	A1, A2	Set sweep generator output to produce 3 volts peak to peak on scope. Adjust A1 and A2 alternately for maximum gain and symmetry with the 45.75MC marker positioned as shown in Fig. 1. The 39.75MC marker can fall within ±.5MC of the specified frequency. If the desired response cannot be obtained, check to see that the cores are entering their respective windings from opposite ends of the coils.
2.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	"	39.75MC 41.25MC 47.25MC	"	"	A3, A4, A5, A6	Connect a clip lead from point Ⓐ to chassis. Connect a clip lead from TP3 to point Ⓑ. Use high scope again and adjust A3 thru A6 for MINIMUM marker amplitudes as in Fig. 2. A3 controls the 39.75MC marker, A4 controls the 41.25MC marker and A5 and A6 control the 47.25MC marker.
3.	"	"	"	41.25MC 42.75MC 45.0MC 45.75MC	"	"	A7, A8, A9, & Mixer Plate Coil	Remove clip lead from point Ⓑ and connect to chassis. Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. A7 affects low side of curve and A8 affects the high side. Remove clip leads.

SOUND IF ALIGNMENT

Connect an adjustable attenuator between the antenna and the receiver antenna terminals. Tune in a TV station and adjust the attenuator until the signal is below the limiting level of the 6BN6 as evidenced by a hiss similar to super-regeneration in the sound. Adjust A10, A11, A12 and A13 for maximum sound and best quality. Adjust the Buzz control (R10) for MINIMUM buzz. If the hiss disappears during alignment, further reduce the signal until the hiss returns.

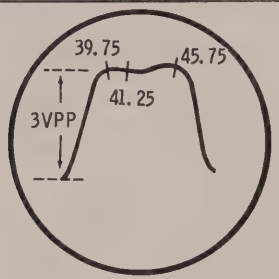


FIG. 1

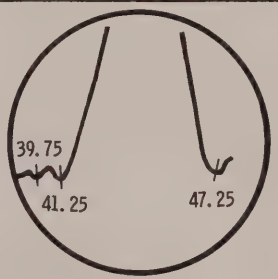


FIG. 2

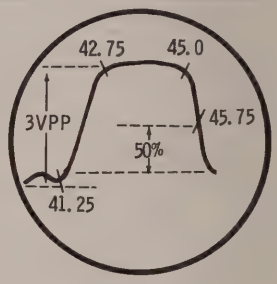
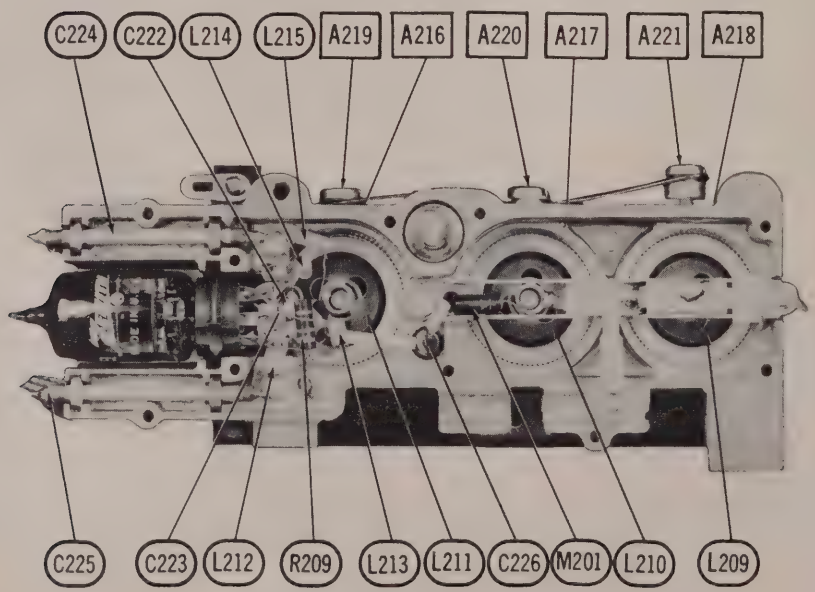
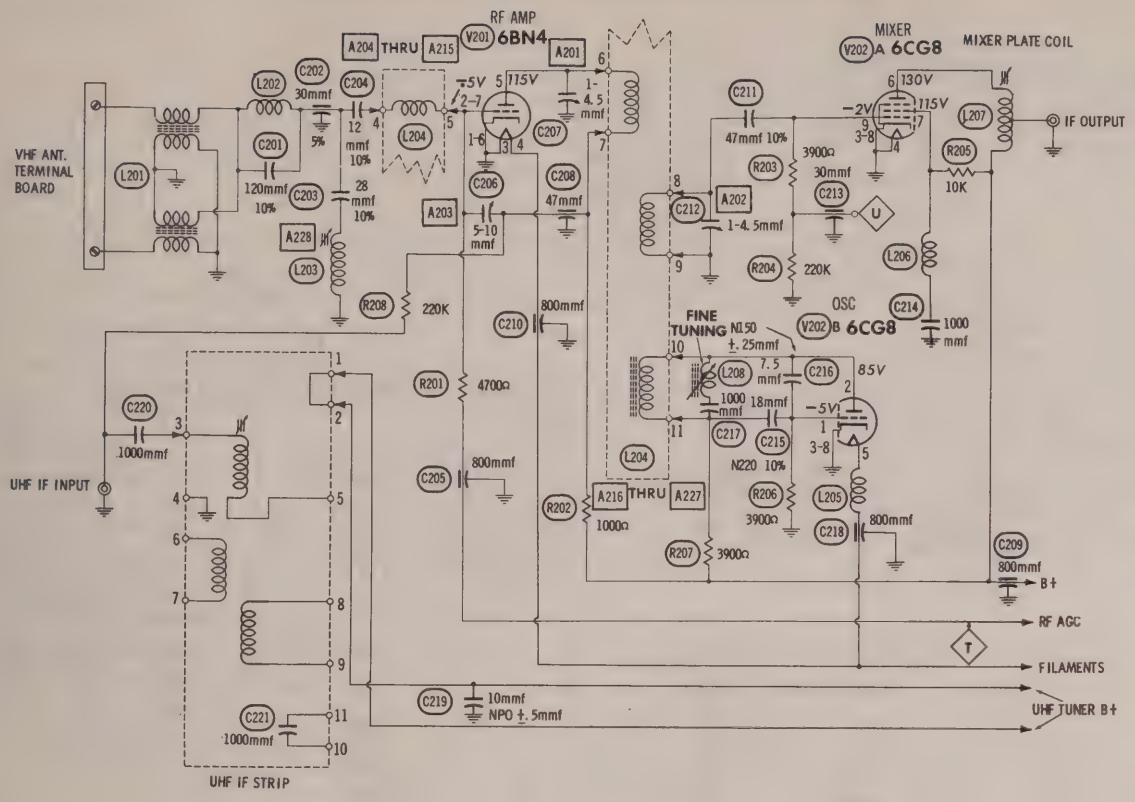


FIG. 3

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 6, 8 & 27.



UHF TUNER 175-4



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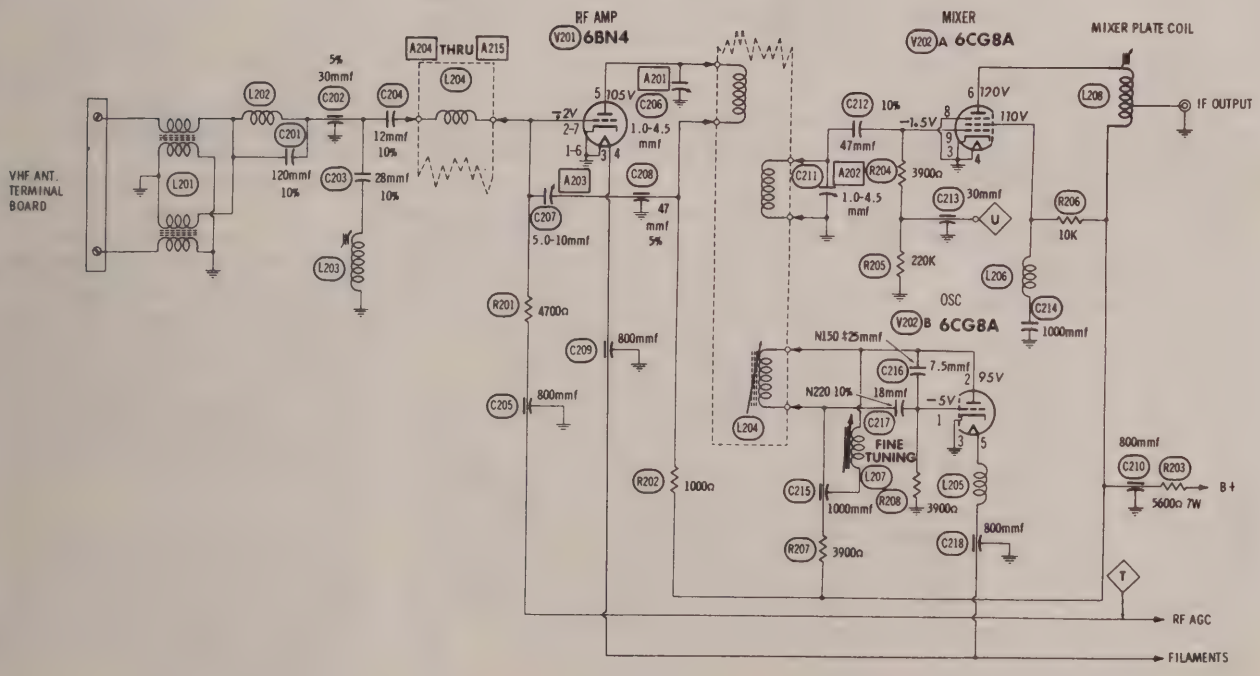
VHF TUNER with UHF provisions S-42843



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VHF TUNER S-42842, 175-104

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS S-42842, S-42843, 175-104

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggest alignment tools:
A201, A202, A203 ..... General Cement #5009, 8195, 8274, 8275, 8728, 8987
Walsco #2515, 2531
Osc. Adjustments ..... General Cement #8729, 9294, 8988, 8989
Walsco #2532, 2538
A222 ..... General Cement #9296, 9297
Walsco #2546, 2547

VHF OSCILLATOR ALIGNMENT

Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated.
Adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT

Connect negative lead of 0-15 volt variable bias supply to point (T) . Positive to chassis. Adjust bias for 2.5 volts at point (T) .
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

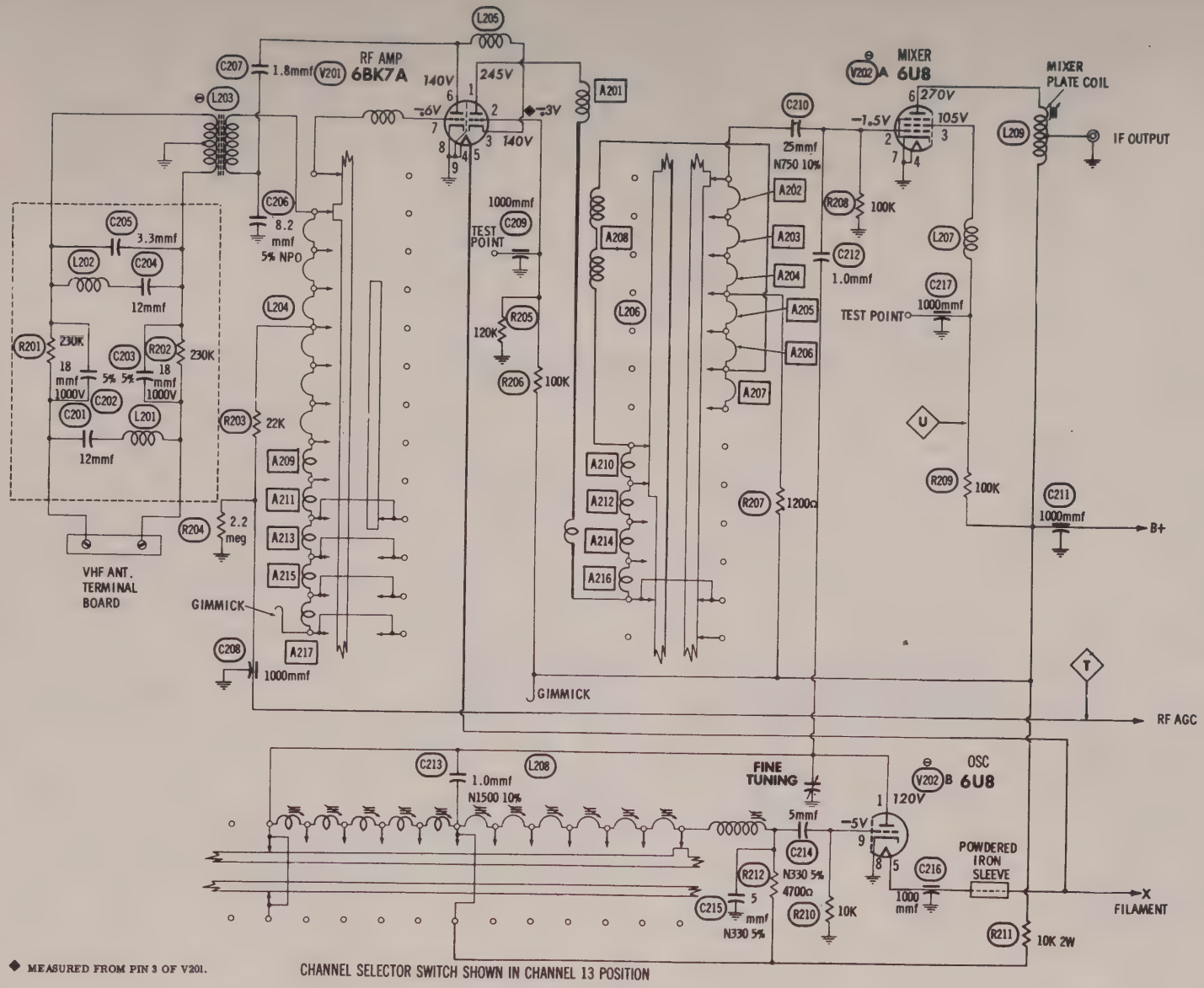
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Fig. 203	Across antenna terminals matching network (Fig. 203).	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point (T) . Low side to chassis.	A201, A202, A203	Adjust A201 and A202 for maximum amplitude and symmetry with markers as shown in Fig. 201. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A203 to obtain MINIMUM response on the scope.
2.	"	"	213MC	211.25MC 215.75MC	13	"	A204	Adjust for maximum amplitude of response similar to Fig. 201. Adjust by expanding or compressing coil turns.
			207MC	205.25MC 209.75MC	12		A205	
			201MC	199.25MC 203.75MC	11		A206	
			195MC	193.25MC 197.75MC	10		A207	
			189MC	187.25MC 191.75MC	9		A208	
			183MC	181.25MC 185.75MC	8		A209	
			177MC	175.25MC 179.75MC	7		A210	
			85MC	83.25MC 87.75MC	6		A211	
			79MC	77.25MC 81.75MC	5		A212	
			69MC	67.25MC 71.75MC	4		A213	
			63MC	61.25MC 65.75MC	3		A214	
			57MC	55.25MC 59.75MC	2		A215	

UHF ALIGNMENT FOR TUNER #175-4

Alignment of the UHF tuner should not be attempted unless proper test equipment is available. Switch the receiver to the UHF position.
Connect 2 volts bias to the IF AGC line and adjust the sweep generator output to provide 3 volts peak to peak on the scope in the following steps.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Fig. 203	Across UHF antenna terminals thru matching network (Fig. 203).	713MC	711.25MC	54	Vert. Amp. thru 10K across video detector load.	A216, A217, A218	Tuner rocker arm should be in a horizontal position. If necessary, loosen the set screw and adjust the tuner so that rocker arm is horizontal when the channel selector is set at channel 54. Do not adjust A216 unless oscillator calibration is off more than 3 channels. If necessary, adjust A216 to place video marker at 50% on response curve as in Fig. 202. The image (weaker response) will appear also. The response toward the counter clockwise position of A216 is the proper response. Adjust A217 and A218 for maximum amplitude of response similar to Fig. 202.
4.	"	"	473MC	471.25MC	14	"		Check for response similar to Fig. 202. If the oscillator is off more than 3 channels, adjust the oscillator travel (oscillator, mixer and antenna travel adjustments are the 3 round screws on top of the UHF tuner) adjustment to scale. Care must be used in making this adjustment so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope.
5.	"	"	887MC	885.25MC	83	"	A219, A220, A221	Adjust A219 to place marker at 50% as in Fig. 202. Adjust A220 and A221 for maximum gain and symmetry similar to Fig. 202.

TUNER ALIGNMENT CONTINUED PAGES 8 & 27



◆ MEASURED FROM PIN 3 OF V201.

CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION

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VHF TUNER #175-102

ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS FOR TUNERS #175-101, 175-102

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT

Set the fine tuning to the center of its range by turning fine tuning shaft until the small index hole in the drive cam is directly over the small hole just below the channel 13 oscillator adjustment screw. Starting with the highest channel operating in the area, adjust the appropriate oscillator adjustment screw for best picture and sound for each channel available.

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 2 volt bias supply to point Ⓣ . Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Matching Network	Across antenna terminals .	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point Ⓤ . Low side to chassis.	A201	Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown.
2.	"	"	207MC	205.25MC 209.75MC	12	"	A202	"
3.	"	"	201MC	199.25MC 203.75MC	11	"	A203	"
4.	"	"	195MC	193.25MC 197.75MC	10	"	A204	"
5.	"	"	189MC	187.25MC 191.75MC	9	"	A205	"
6.	"	"	183MC	181.25MC 185.75MC	8	"	A206	"
7.	"	"	177MC	175.25MC 179.75MC	7	"	A207	"
8.	"	"	85MC	83.25MC 87.75MC	6	"	A208, A209	Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown. Adjust first coil for proper marker position and second coil for maximum gain and symmetry.
9.	"	"	79MC	77.25MC 81.75MC	5	"	A210, A211	"
10.	"	"	69MC	67.25MC 71.75MC	4	"	A212, A213	"
11.	"	"	63MC	61.25MC 65.75MC	3	"	A214, A215	"
12.	"	"	57MC	55.25MC 59.75MC	2	"	A216, A217	"

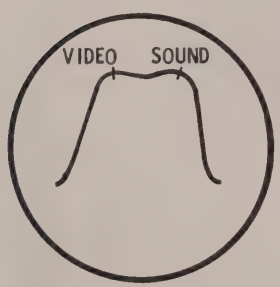


FIG. 201

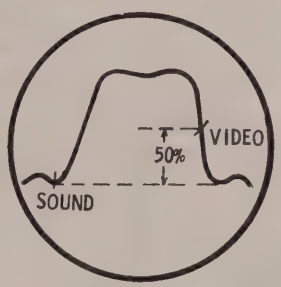
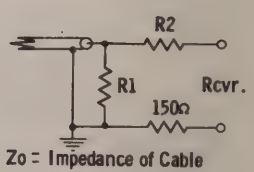


FIG. 202

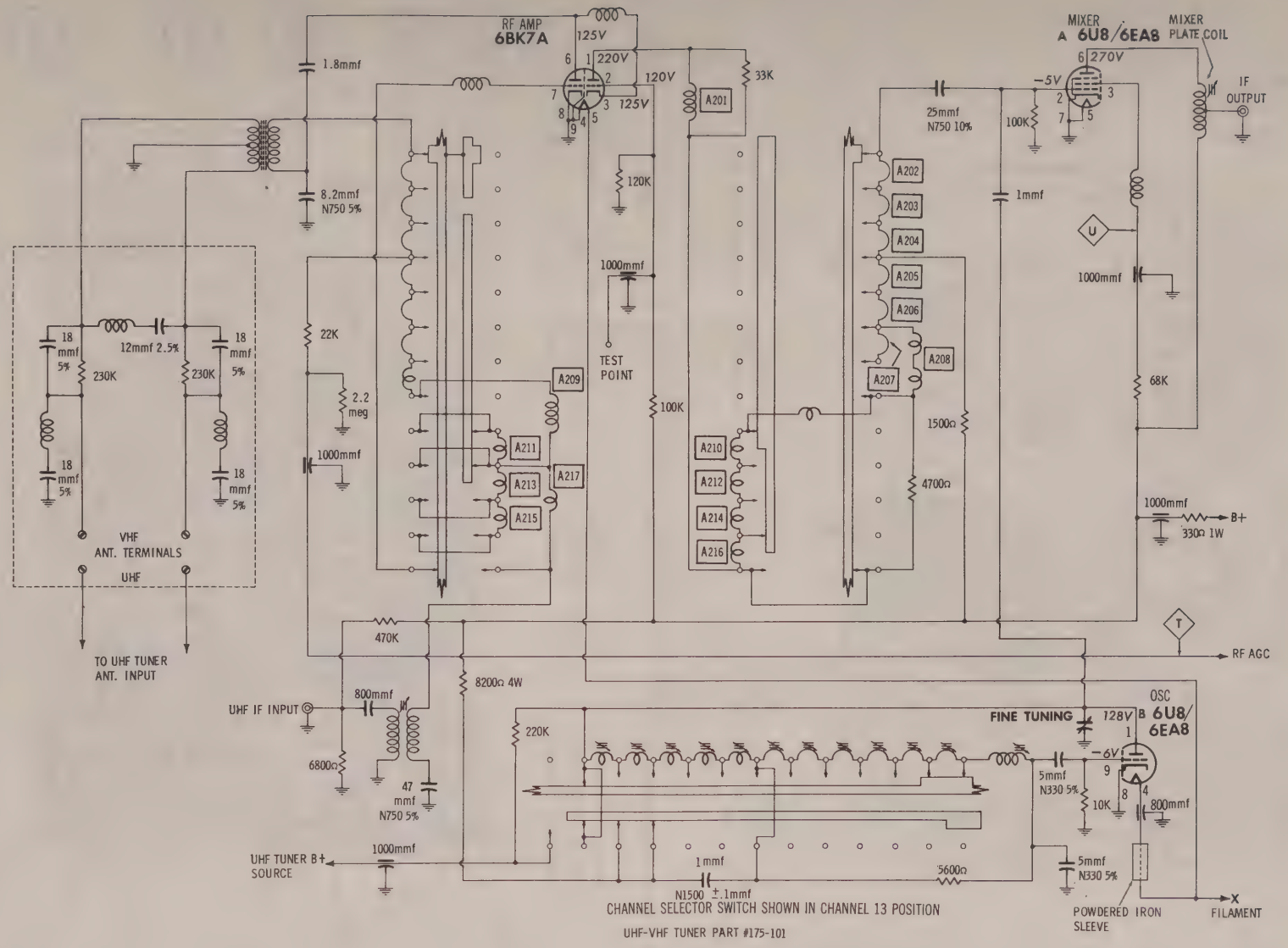


Zo = Impedance of Cable

Zo	R1	R2
50Ω	50Ω	120Ω
75Ω	82Ω	110Ω
92Ω	110Ω	110Ω

FIG. 203

ADDITIONAL TUNER ALIGNMENT ON PAGES 6 & 27.



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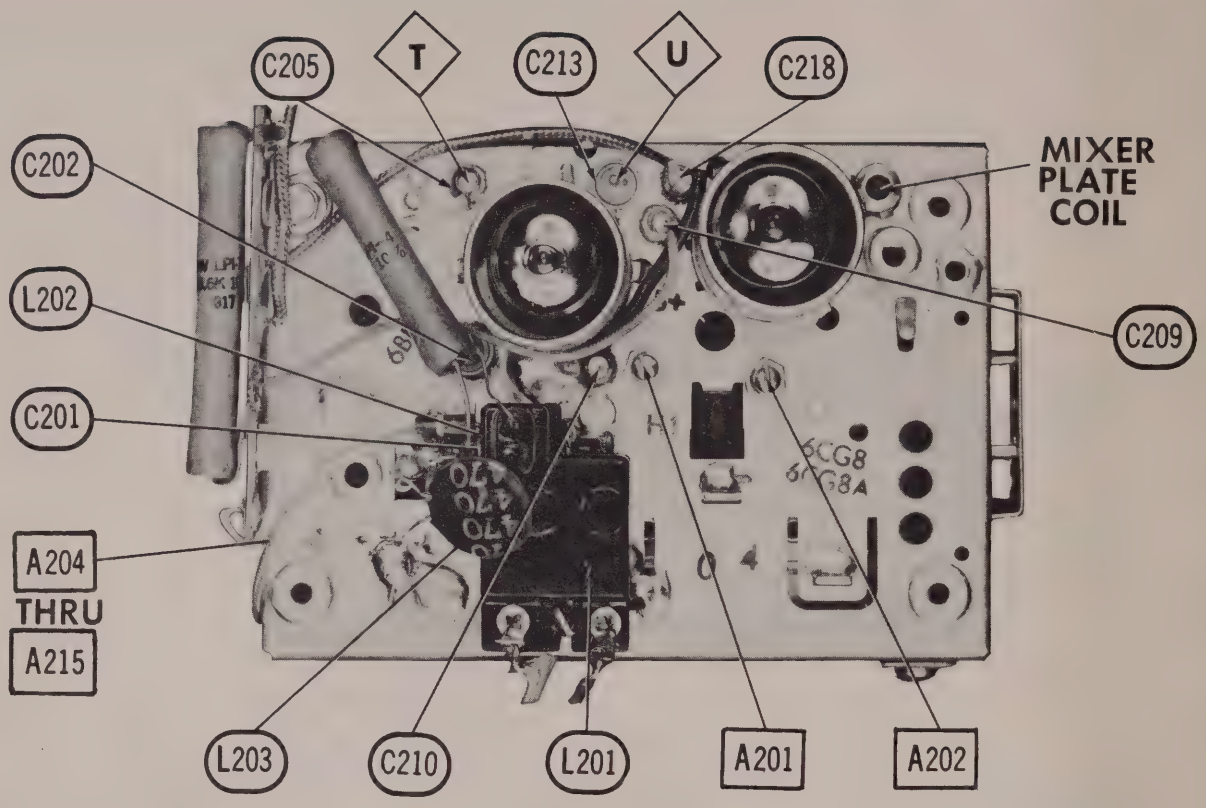
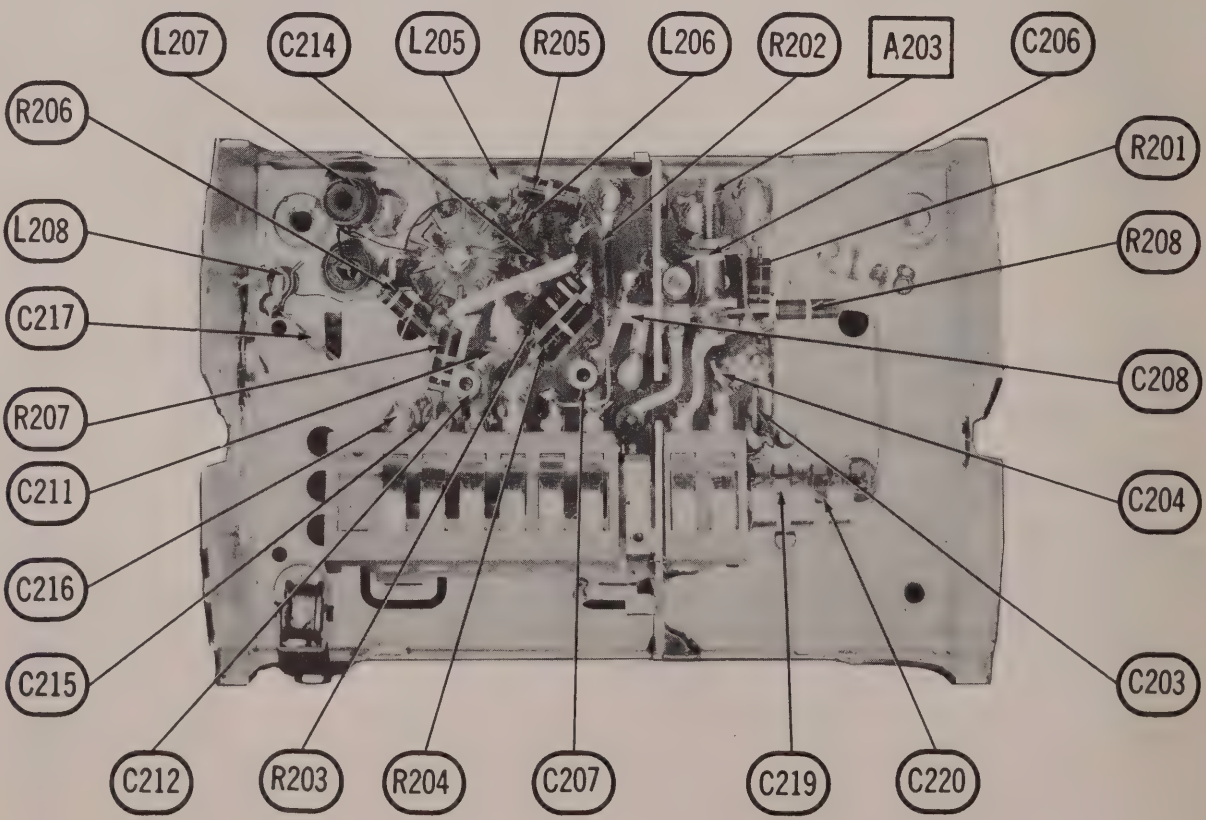
VHF with UHF provisions 175-101

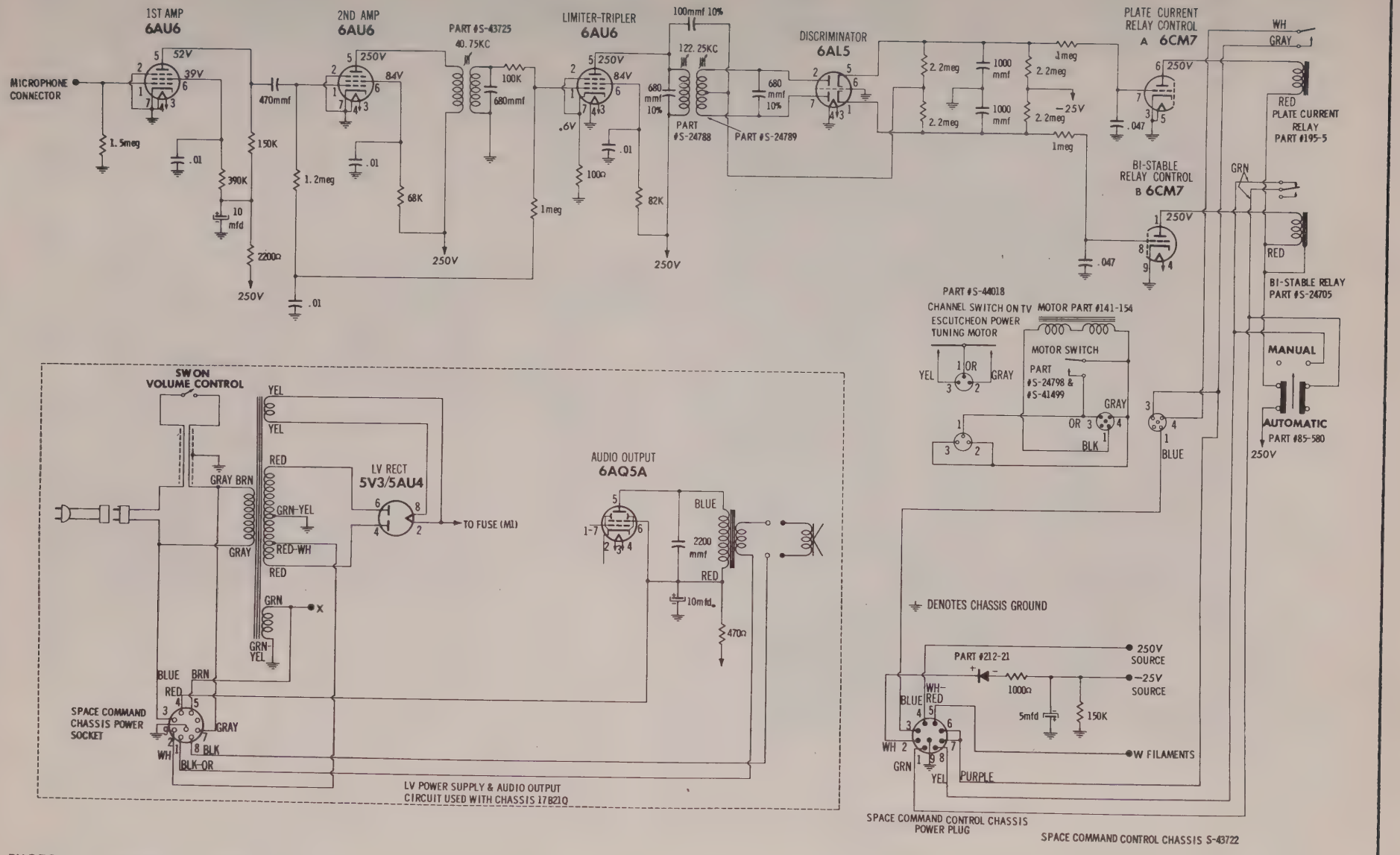
ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26



TUNER S-42843 - TOP VIEW



TUNER S-42843 - BOTTOM VIEW



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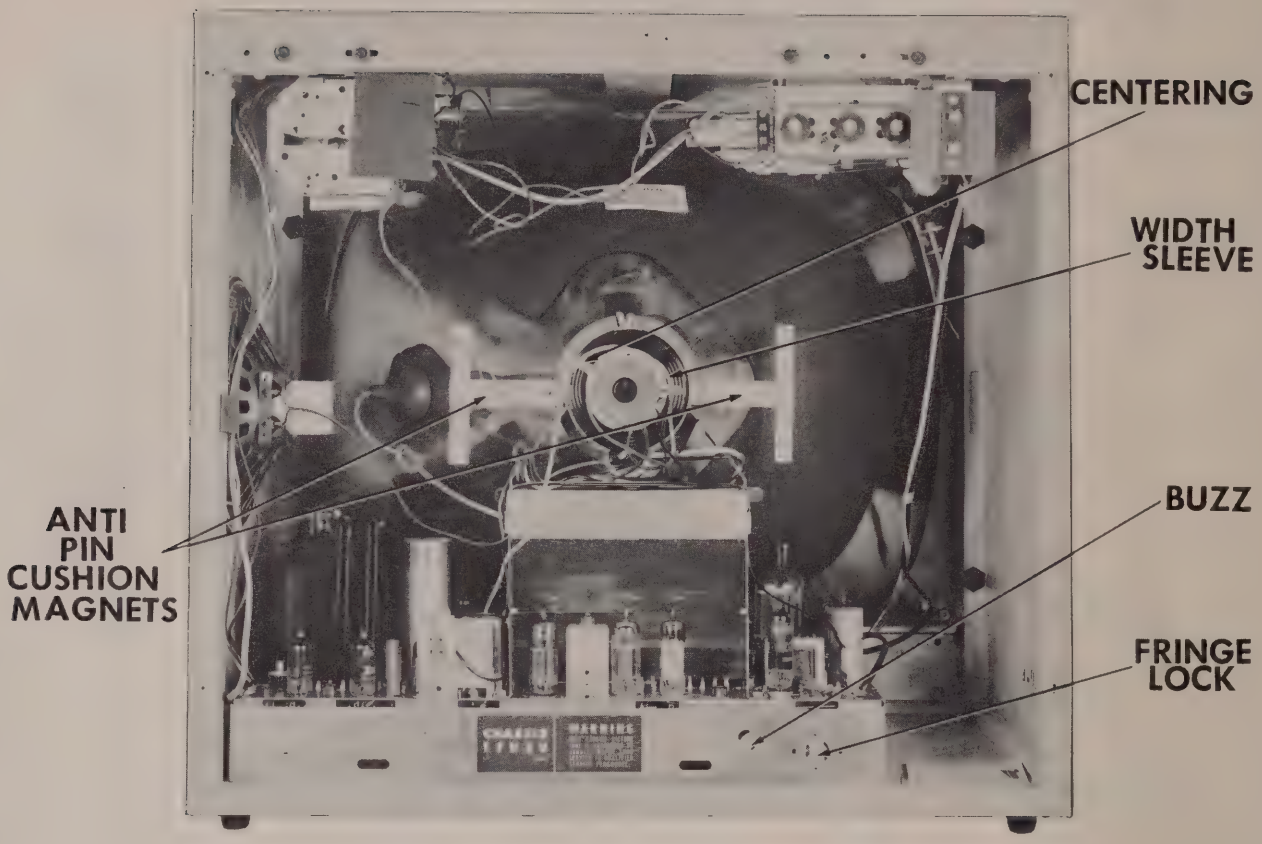
REMOTE CHASSIS S-43722 & ALTERNATE CIRCUITS CH. 17B21Q

ZENITH CHASSIS 17B20, Q, U, UD,
17B21Q, 17B22, 5B26



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the Brightness and Contrast controls for a normal picture.

Turn the Horizontal Hold control clockwise until the picture loses sync.

It may be necessary to switch off channel and back again for picture to lose sync.

Turn the Horizontal Hold slowly counterclockwise until the picture just falls into sync.

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	1st Video IF Amp.	6BZ6	
V2	2nd Video IF Amp.	6BZ6	
V3	3rd Video IF Amp.	6DK6	6BZ6 *
V4	Video Output-Sound IF Amp	6EB8	
V5	AGC Keying-Noise Limiter - Sync Sep.	6BU8	
V6	Audio Det.	6BN6	
V7	Audio Output	6AQ5A	

* Alternate

ITEM No.	USE	TYPE	NOTES
V8	Vert. Mult.-Vert. Output	6CY7	6DR7 *
V9	Horiz. Phase Det. - Horiz. AFC	6CN7	
V10	Horiz. Osc.-Horiz. Disch.	6CG7	
V11	Horiz. Output	6DQ6A	
V12	Damper	6AX4GT	
V13	HV Rect.	1J3GT	
V14	LV Rect.	5U4GB	5V3† or 5AU4 †

† Ch. 17B21Q.

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	ZENITH PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.	
V15	21CXP4 24AJP4		21CXP4 ①	21CXP4 ② 24AJP4 ①	① "Silverama" ® ② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	400	22-2971	AFH4-113-50	C0890	FP454.8		Q-460	TVLS-4805.2*
B	■80	400			BR1250			TD-4520	
C	100	50							
D	▲10	475							
C2A	▲4	350	22-2744	AFH3-180	C1445	FP345.2		T-610	TVL-3806.6
B	■10	400							
C	20	25							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	470		22-6	BPD-00047	DD-471	BYA10T47	B-347	5HK-T47	
C4	.068	200	22-2572	P288N-068		CUB4S68	GEM-4168	4TM-S68	
C5	470		22-6	BPD-00047	DD-471	BYA10T47	B-347	5HK-T47	
C6	4		22-2549			C10V4C		5TCCB-V4S ±.5mmf *	±.5mmf NPO
C7	12		22-2379		TCZ-12	C10Q12C	CNO-412	5TCC-Q12S 5% *	5%
C8	12		22-2379		TCZ-12	C10Q12C	CNO-41	5TCC-Q12S 5% *	5%
C9	1000		22-17	DI-001			JL-210	5GA-D1S 10% *	10%
C10	.15	200	22-2147	P288N-15		CUB2P15	GEM-2015	2TM-P15	
C11	1.0		22-1762	NPO-SI 1	TCZ-1		CNO-510	5TCCB-V1	10%
C12	7.0		22-2513					5TCCB-V7S ±.5mmf *	±.5mmf
C13	470		22-16	DI-00047	MD-471		JL-347	5GA-T47	10%
C14	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C15	1000		22-17	DI-001			JL-210	5GA-D1S 10% *	10%
C16	470		22-16	DI-00047	MD-471		JL-347	5GA-T47S 10% *	10%
C17	1000		22-17	DI-001			JL-210	5GA-D1S 10% *	10%
C18	330		22-2866	1469-00033	MD-331	5R5T33		MS-333	10%
C19	470		22-16	DI-00047	MD-471		JL-347	5GA-T47S 10% *	10%
C20	5		22-2990						N470 5%
C21	7.5		22-2742					5TCCB-V75S *	
C22	47		22-2467						N080 5%
C23	3.3		22-2343	NPO-SI 3.3	TCZ-3R3	CTA6V33C	CNO-533	5TCCB-V33	
C24	24				TCZ-24			5TCC-Q24S 5% *	NPO 5% ①
C25	10		22-3066	NPO-SI 10	D6-010	L10Q1	CNO-410	5TCC-Q1	10%
C26	50		22-2460	SI 50	D6-050	L10Q5		5GA-Q5	
C27	.033	200	22-2510					2WF-S33	10%
C28	.1	200	22-1777	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C29	.1	200	22-1777	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C30	1000		22-17	DI-001			JL-210	5GA-D1S 10% *	10%
C31	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C32	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C33	50		22-2460	SI 50	D6-050	L10Q5		5GA-Q5	
C34	4.3		22-3072						10%
C35A	1000		22-21	BPD-2X001	DD2-102	BYC6DD1		5HK-D1	
B	1000							5HK-D1	
C36	7.5		22-2742					5TCCB-V75S*	
C37	470		22-6	BPD-00047	DD-471	L10T47	B-347	5GA-T47	
C38	10		22-2411						N150 10%
C39	10000		22-3	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C40	2200		22-8	BPD-0022	DD-222	L10T22	B-222	5HK-D22	
C41	3300		22-11	BPD-0033	DD-332	L10D33	B-233	5HK-D33	
C42	470		22-6	BPD-00047	DD-471	BYA10T47	B-347	5HK-T47	
C43	.1	200	22-1777	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C44	.022	400	22-2621					5BF-S22	10%
C45	.0068	200	22-2656				GEM-16268	2WF-D68	10%
C46	.1	400	22-2061	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C47	.015	1000	22-3040					10TM-S15	10%

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA ZENITH PART No	AEROVOX PART No	CENTRALAB PART No	CORNELL-DUBILIER PART No	MALLORY PART No	SPRAGUE PART No	NOTES
C48	.047	200	22-1778	P388N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C49	.033	400	22-2635					5BF-S33	10%
C50A	100							5GA-T1	
B	100		22-23	BPD-0001	DD-101	L10T1		5GA-T1	
C51	4700		22-14	DI-0047			JL-347	5GA-D4T8 10% *	10%
C52	4700		22-14	DI-0047			JL-347	5GA-D4T8 10% *	10%
C53	1000		22-17	DI-001			JL-320	5GA-D1S 10% *	10%
C54	.047	200	22-1778	P388N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C55	330		22-2667	1469-00033	MD-331			MS-333	10%
C56	1	200	22-1777	P388N-1	DF-104	CUB2P1	GEM-301	2TM-P1	
C57	1100		22-2859	1464-0011		1N5DL1		MS-211	10%
C58	1500		22-17	DI-0015			JL-315	5GA-D1S2 10% *	10%
C59	4700		22-14	DI-0047			JL-347	5GA-D4S8 10% *	10%
C60A	1000							5HK-D1	
B	1000		22-21	BPD-1X00I	DD3-102	BYC5DDI		5HK-D1	
C61	4700		22-14	DI-0047			JL-347	5GA-D4T8 10% *	10%
C62	1	600	22-1841	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C63	110	4000	22-3694						N750 10%
C64	1000		22-3	BPD-01	DD-103	BYA10S	B-110	5HK-S1	
C65	56	2000			DD30-560	HVA20Q56		20GA-Q56	10%
C66	2200		22-8	BPD-0022	DD-222	BYA20Q22	B-222	5HK-D22	

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
① Some versions may use 27mmf in this application (Part #22-3065).

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No	MALLORY PART No	INSTALLATION NOTES
R1	1meg	½	63-4005				FP16A	Volume & Switch
R2A	1meg	½	63-3658	B-70	A47-1meg-Z	Q3-137	U53	Tone
B	Shaft			Not Req.	K26-3	Not Req.	Not Req.	
R3A	750K	½	63-3299	B-66	A47-750K-S	Q1-136	U54	Vert. Hold
B	Shaft			Not Req.	K26-3	Not Req.	Not Req.	
R4A	250K	½	63-3572	B-50	A47-250K-S	Q1-130	U46	Brightness
B	Shaft			Not Req.	K26-3	Not Req.	Not Req.	
R5	20K	½	63-4056					Contrast, Tap ④ 10K
R6A	3meg	½	63-4026	AB-84	A47-3meg-S	B11-140	TA38L	Focus
B	Shaft			AK-2	FK3-1/4	SK-2	Not Req.	
R7A	10K	½	63-4096	AB-14	A47-10K-S	B11-116	TA14L	AGC
B	Shaft			AK-1	FK3-1/4	SK-2	Not Req.	
R8A	3000Ω	½	63-3588	AB-8	A47-3000-S	B11-112	PTA32L	Vert. Lin.
B	Shaft			AK-1	FK3-1/4	SK-2	Not Req.	
R9A	7.5meg	½	63-4058	AB-89	A47-7.5meg-S	B11-142	PTA75L	Vert. Size with 1meg stop
B	Shaft			AK-1	FK3-1/4	SK-2	Not Req.	
R10	750Ω	2(WW)	63-3264		39-800-50			Buzz
R11A	5meg	½	63-4012	AB-88	A47-5meg-Z	B11-141	PTA58L	Fringe Lock
B	Shaft			AK-1	FK3-1/4	TM-1	Not Req.	

† Use 1meg resistor in series with right hand terminal.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R12	8200Ω	4	63-3602	
R13	220K		63-1884	
R14	5600Ω	7	63-3986	
R15	2.2meg		63-1926	
R16	22K		63-2848	
R17	1000Ω		63-1786	
R18	680K			
R19	22K		63-2848	
R20	56Ω		63-1733	
R21	120K		63-1873	
R22	120K		63-1873	
R23	33K		63-4008	
R24	220Ω		63-1758	
R25	220Ω		63-1758	
R26	22Ω		63-1715	
R27	8200Ω	3	63-4098	
R28	120Ω		63-1747	
R29	2700Ω	5%	63-1803	
R30	7500Ω	4	63-4055	
R31	3900Ω		63-1810	
R32	39K		63-1852	
R33	47K		63-1855	
R34	330Ω		63-1785	
R35	22K	2	63-4403	
R36	100K		63-1869	
R37	15K		63-1834	
R38	150Ω		63-1708	
R39	150K		63-1876	
R40	220K		63-1884	
R41	27K		63-1845	
R42	180K		63-1880	
R43	56K	5%	63-1858	
R44	470K	1	63-2549	
R45	68K		63-1862	
R46	330K		63-1891	
R47	1.5meg		63-1918	
R48	1meg		63-1911	
R49	3.3meg		63-4090	
R50	100K		63-1870	
R51	150K		63-1876	
R53	680Ω		63-1779	
R53	390K		63-1894	
R54	27K	2	63-4093	

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R55	470Ω	1	63-1771	Note 1
R56	820Ω		63-1784	
R57	220K		63-1883	
R58	100K		63-1869	
R59	47K		63-1855	
R60	6.2meg		63-1930	
R61	100K		63-1870	
R62	22K	2	63-1566	
R63	82K		63-1864	
R64	33K		63-4041	
R65	22K		63-1843	
R66	220K		63-1883	
R67	68K		63-1862	
R68	82K		63-1864	
R69	2.2meg		63-1926	
R70	100K		63-1786	
R71	33K		63-4008	
R72	1200Ω	1	63-1976	
R73	4700Ω		63-1813	
R74	390Ω		63-1788	
R75	390Ω		63-1789	
R78	330K		63-1890	Note 2
R77	330K		63-1890	Note 2
R78	1meg		63-1911	
R79	100K		63-1869	
R80	68K		63-1862	
R81	390Ω		63-1768	
R82	22K		63-1842	
R83	10K	2	63-2145	
R84	39K		63-1852	
R85	180K	1	63-2313	
R86	22K		63-1842	
R87	1meg		63-1913	
R88	100Ω		63-1744	
R89	100Ω		63-1744	
R90	10K	3	63-4097	
R91	56K	2	63-2341	
R92	82K		63-1866	
R93	3.9Ω		63-4063	Note 3
R94	22K	1	63-1055	
R95	220K		63-3607	
R96	1500Ω		63-1792	

Note 1. Chassis 17B2Q uses 330Ω 2W in this application (Part #63-1522).
Note 2. Some versions may use 100K in this application (Part #63-1869).
Note 3. Some versions may use an orange resistance wire for HV filament lead and omit R93.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA ZENITH PART No	Meissner PART No	Merit PART No	Miller PART No	Rem PART No	NOTES
L1A	1st Video IF	S-43892					
B	41.25MC Trap						
L2A	47.25MC Trap	S-41883					
B	39.75MC Trap						
L3A	2nd Video IF	S-43443					
B	47.25MC Trap						
L4	3rd Video IF	S-41891		17-4533 *	TV-130 *	6224 *	VF-3 *
L5	4th Video IF	S-41892					Includes L5 & M2
L6	Series Peaking Coil	S-41879					81 Microhenries
L7	Shunt Peaking Coil	S-43619		19-3180	TV-184		VP-5 — 171 Microhenries
L8	RF Choke	S-21898		19-1004	BC-565		8.7 Microhenries
L9	Shunt Peaking Coil	S-43631		19-3250	TV-185		VP-6 — 250 Microhenries
L10	Series Peaking Coil	S-43618		19-3180 ▲	TV-184 ▲	6180 ▲	VP-5 ▲ 170 Microhenries, wound on 5600Ω resistor
L11	1st Sound IF	S-43125			TV-190		
L12	2nd Sound IF	S-41899		17-1021 ♦	TV-149		
L13	Quadrature Coil	S-19020		20-1005 *	TV-121 *	1480 *	

* Drill new mounting hole. ▲ Parallel with 5600Ω resistor. ♦ Enlarge mounting hole.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Rem PART No.	Thordarson PART No.	NOTES
L14	163Ω		S-19743		TV-169	6324		22-6	Horiz. Freq. tapped ⑥ 73Ω

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	RATINGS DC RES.	RATINGS INDUCTANCE @ CURRENT 1000 (^)	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No	Thordarson PART No	Triad PART No
L15	.250A	52Ω	1.8 Hy.	96-1553 ①		C5037 ② C-3991 ③		C-2326 ③	22C44	C-23X
		52Ω	1.4 Hy.	96-1559 ②		C5037 ③ C-3996 ③		C-2326 ③	22C44	C-23X

① Used in Ch. 17B20Q, U, UD, 17B22. ② Used in Ch. 17B21Q. ③ Drill new mounting hole.

TRANSFORMER (POWER)

ITEM No	RATING PRI	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA ZENITH PART No	Halldorson PART No	Merit PART No	Rem PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	117V @ 1.75A	560VCT @ .260A	5V @ 3A	96-1555 ①						
		SEC. 3	SEC. 4	SEC. 5						
		6.3V @ 8.4A								

① Chassis 17B21Q uses Part #96-1562.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No	Merit PART No	Rem PART No	Rogers PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Vert. Output	96-1552		A-2853 ①	V316 ①		A-8148 ①		
T3	Yoke-Horiz. (12MH) (90°)-Vert. (37MH)	96-1610 ②	DF606 ③④	MDF-91 ③④	Y90P19/47 ①④	PCM1045 ③④	DY-43A ③④	Y-39 ③⑤	Y-40 & NW11
	Rear Cover & Centering Device	S-43091							YC-1 & CL-1
	Alt. Rear Cover & Centering Device	S-23237							
T4	Horiz. Output	S-41906			X137 ③*		HO-27⑥*	FLY-118 ⑤ ⑥	D-130R *

① Cut and tape green lead.
② Includes rear cover and centering device.
③ Use original yoke damping network, if necessary.
④ Use original rear cover and centering device. Cut and form a piece of .010 gauge fish paper inside the yoke itself and support with an acetate cement to provide an insulation between the width sleeve and the yoke proper.
⑤ Connect yoke terminal #2 to terminal #2 of T4, yoke terminal #1 to terminal #1 of T4.
⑥ Use original mounting bracket.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Rem Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4			4		4	4	4
3			3		3	3	3
2			2		2	2	2
1			1		1	1	1

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No	NOTES
T5	20.8K	3-4Ω	96-1569	EM17	A-3893	AU-808	A-3879	24S52	S-17X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA ZENITH PART No	GUAM PART No.	NOTES
SP1	8"	PM	3-4Ω	49-780 ① ⑤	8A21	① Used in Models B2223E, EU, EUD, R, RU, RUD, Y, YU, YUD, B2225, E, EU, EUD, R, RU, RUD, U, UD, B2245, E, EU, EUD, R, RU, RUD, U, UD, B2346E, EU, EUD, R, RU, RUD, B3004, E, R, B3007E, R, B3008R
	5"	PM	3-4Ω	49-751 ② ⑤	52A1	② Used in Models B222R, RU, RUD, Y, YU, YUD, B3000E, R, B3001E, R
		PM	3-4Ω	49-634 ③		③ Used in Models B2246E, EU, EUD, R, RU, RUD, B3004, E, R, B3007E, R, B3008R
		PM		49-642 ④		④ Two used in Models B2249, H, HU, HUD, R, RU, RUD, U, UD, B3009, E, Y
		PM		49-818 ⑤		⑤ Used in Models B2346E, EU, EUD, R, RU, RUD, B3007E, R, B3008R
		PM		49-851 ⑥		⑥ Used in Models B2347E, EU, EUD, R, RU, RUD, B2673, E, EU, EUD, R, RU, RUD, U, UD
		PM		49-831 ⑦		⑦ Two used in Models B2254E, EU, EUD, H, HU, HUD, R, RU, RUD
		PM		49-833 ⑧		⑧ Used in Models B2383, E, EU, EUD, R, RU, RUD, U, UD
		PM		49-846 ⑨		

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ZENITH PART No	REPLACEMENT DATA
IC	Vert. Integrator		87-5	Sprague V-15
VC1	Vert. Feedback		87-4	Sprague V-14

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA ZENITH PART No. FUSE	ZENITH PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No FUSE	BUSS PART No HOLDER
M1	N	7/10A 250V S/B	136-38	62-10	333.600 (N-6/10A-125V-S/B)	346010	N 7/10	HN 1/2 to 3/4

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA ZENITH PART No.	CBS PART No.	SYLVANIA PART No.	NOTES
M2	1N64	103-23	1N64	1N295	Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Lamp		#47
M4	Lamp		#39
M5	Tuner	S-42843	VHF with UHF provisions, Ch. 17B20U, UD, 17B22U, UD
	Tuner	175-102	VHF Ch. 17B20
	Tuner	175-104	VHF Ch. 17B20, 17B22
	Tuner	S-42942	VHF Ch. 17B20Q, 17B21Q
	Tuner	175-101	VHF with UHF provisions, Ch. 17B20U
M6	Tuner	175-4	UHF Ch. 17B20UD, 17B22UD
	Tuner	175-2	UHF Ch. 17B20U, 17B22U
M7	Width Sleeve		
M8	Magnet	S-41923	Anti-Pin Cushion (2 used)
	Switch	85-617	TV-Phono, Off-On, Ch. 17B23, U, UD

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO	DESCRIPTION
Safety Glass	192-238	Models B222Y, YU, YUD, B2223Y, YU, YUD
Safety Glass	192-239	Models B222R, RU, RUD, B2223E, EU, EUD, R, RU, RUD, B2225, E, EU, EUD, R, RU, RUD, B2245, E, EU, EUD, R, RU, RUD, B2345, E, EU, EUD, R, RU, RUD, B2346E, EU, EUD, R, RU, RUD, B2349, H, HU, HUD, R, RU, RUD, U, UD, B2383, E, EU, EUD, R, RU, RUD, U, UD
Safety Glass	192-262	Models B2347E, EU, EUD, R, RU, RUD, B2254E, EU, EUD, H, HU, HUD, R, RU, RUD
Safety Glass	192-244	Models B2673, E, EU, EUD, R, RU, RUD, U, UD
Safety Glass	192-263	Models beginning "B3"

ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26

FOLDER 2

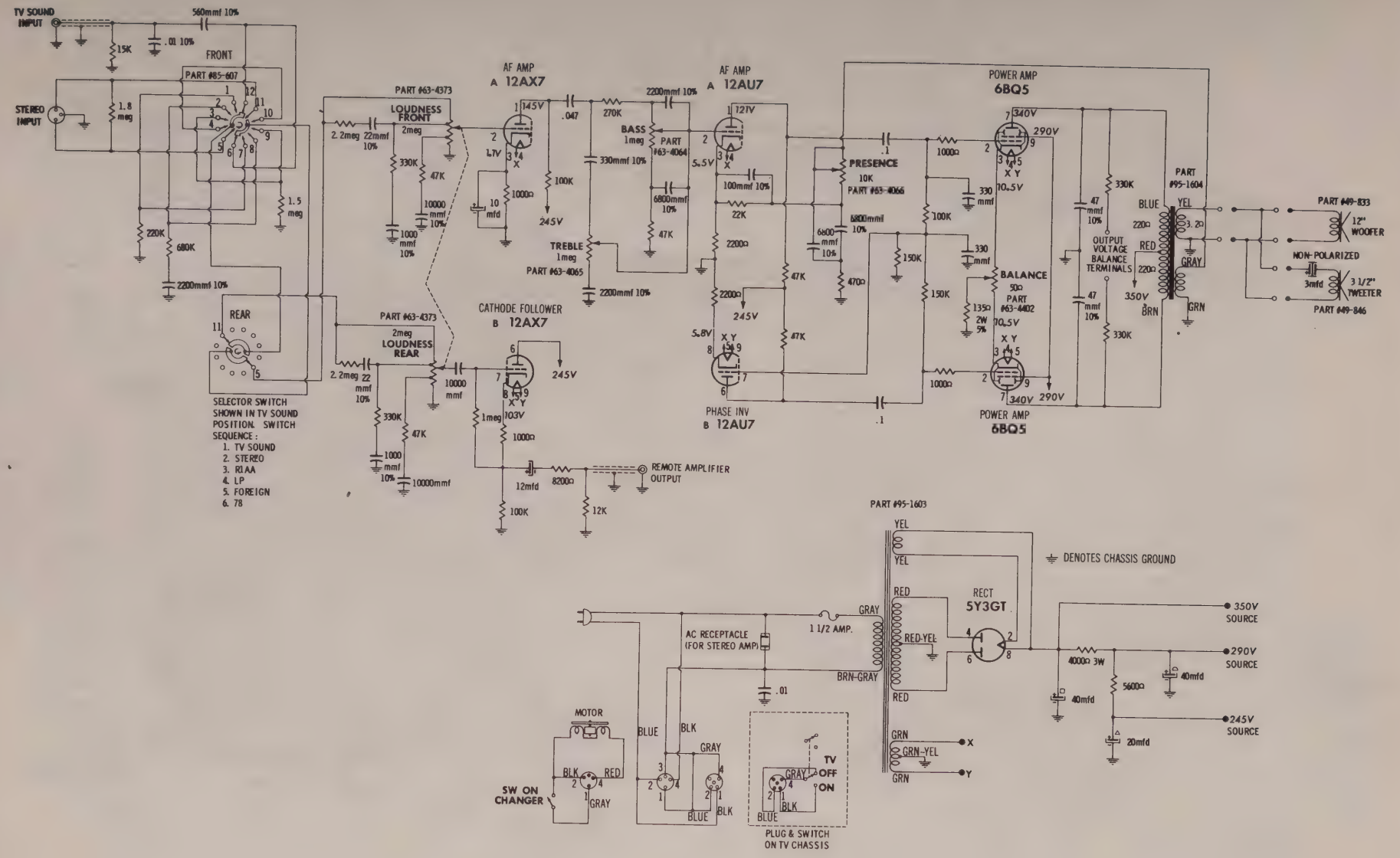
PARTS LIST AND DESCRIPTIONS (Continued)

CABINETS & CABINET PARTS (cont)

NAME	PART NO.	DESCRIPTION
Knob	S-44028	Channel Selector, Models B2221R, RU, RUD, B2247E, EU, EUD, R, RU, RUD, B2254E, EU, EUD, H, HU, HUD, R, RU, RUD
Knob	46-1973	Channel Selector, Models B2221Y, YU, YUD
Knob	S-43769	Channel Selector, Models B2223E, EU, EUD, R, RU, RUD, Y, YU, YUD, B2225, E, EU, EUD, R, RU, RUD, U, UD, B2245, E, EU, EUD, R, RU, RUD, U, UD, B2246E, EU, EUD, R, RU, RUD, B2249, H, HU, HUD, R, RU, RUD, U, UD, B2282, E, EU, EUD, R, RU, RUD, U, UD, B2673, E, EU, EUD, R, RU, RUD, U, UD
Knob	46-2003	Channel Selector, Models beginning "B3"
Knob	S-43768	Fine Tuning, Models beginning "B2"
Knob	S-44006	Fine Tuning, Models beginning "B3"
Knob	S-43780	UHF Dial, Models B2221RU, RUD, YU, YUD, B2223EU, EUD, RU, RUD, YU, YUD, B2225EU, EUD, RU, RUD, U, UD, B2245EU, EUD, RU, RUD, U, UD, B2246EU, EUD, RU, RUD, B2249HU, HUD, RU, RUD, U, UD, B2282EU, EUD, RU, RUD, U, UD, B2673EU, EUD, RU, RUD, U, UD
Knob	S-44142	UHF Dial, Models B2247EU, EUD, RU, RUD, B2254EU, EUD, HU, HUD, RU, RUD
Knob	46-1924	Volume, Models B2221R, RU, RUD, Y, YU, YUD, B2247E, EU, EUD, B2254EU, EUD, HU, HUD, RU, RUD
Knob	46-1970	Volume, Models B2223E, EU, EUD, R, RU, RUD, Y, YU, YUD, B2225, E, EU, EUD, R, RU, RUD, U, UD, B2245, E, EU, EUD, R, RU, RUD, U, UD, B2246E, EU, EUD, R, RU, RUD, B2249, H, HU, HUD, R, RU, RUD, U, UD, B2282, E, EU, EUD, R, RU, RUD, U, UD, B2673, E, EU, EUD, R, RU, RUD, U, UD
Knob	46-1806	Volume, Models B2247R, RU, RUD, B2254E, H, R
Knob	S-43493	Volume. Models beginning "B3"
Knob	S-43672	Brightness, Vert. Hold, Tone
Knob	S-41482	Contrast
Knob	46-1118	Horiz. Hold
Cabinet	14-2251	Models B2221R, RU, RUD
Cabinet	14-2239	Models B2221Y, YU, YUD
Cabinet	14-2241	Models B2223E, EU, EUD
Cabinet	14-2240	Models B2223R,RU, RUD
Cabinet	14-2248	Models B2223Y, YU, YUD
Cabinet	14-2471R	Models B2225, R, RU, RUD,U, UD
Cabinet	14-2471E	Models B2225E, EU, EUD
Cabinet	14-2299	Model B2245, U, UD
Cabinet	14-2299E	Models B2245E, EU, EUD
Cabinet	14-2299R	Models B2245R, RU, RUD
Cabinet	14-2454E	Models B2246E, EU, EUD
Cabinet	14-2454R	Models B2246R, RU, RUD
Cabinet	14-2434E	Models B2247E, EU, EUD
Cabinet	14-2434R	Models B2247R, RU, RUD
Cabinet	14-2485	Model B2249, U, UD
Cabinet	14-2485H	Models B2249H, HU, HUD
Cabinet	14-2485R	Models B2249R, RU, RUD
Cabinet	14-2530E	Models B2254E, EU, EUD
Cabinet	14-2530H	Models B2254H, HU, HUD
Cabinet	14-2530R	Models B2254R, RU, RUD
Cabinet	14-2523	Model B2282, U, UD
Cabinet	14-2523E	Models B2282E, EU, EUD
Cabinet	14-2523R	Models B2282R, RU, RUD
Cabinet	14-2482	Model B2673, U, UD
Cabinet	14-2482E	Models B2673E, EU, EUD
Cabinet	14-2482R	Models B2673R, RU, RUD
Cabinet	14-2474	Model B3000E, B3001E
Cabinet	14-2473	Models B3000R, B3001R
Cabinet	14-2297	Model B3004
Cabinet	14-2297E	Model B3004E
Cabinet	14-2297R	Model B3004R
Cabinet	14-2505	Model B3006
Cabinet	14-2505E	Model B3006E
Cabinet	14-2505R	Model B3006R
Cabinet	14-2484E	Model B3007E
Cabinet	14-2484R	Model B3007R
Cabinet	14-2486R	Model B3008R
Cabinet	14-2524	Model B3009
Cabinet	14-2524E	Model B3009E
Cabinet	14-2524Y	Model B3009Y

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor)
		8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors
		8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor
		8485 (Round) - 5 Conductor
		8488 (Round) - 8 Conductor



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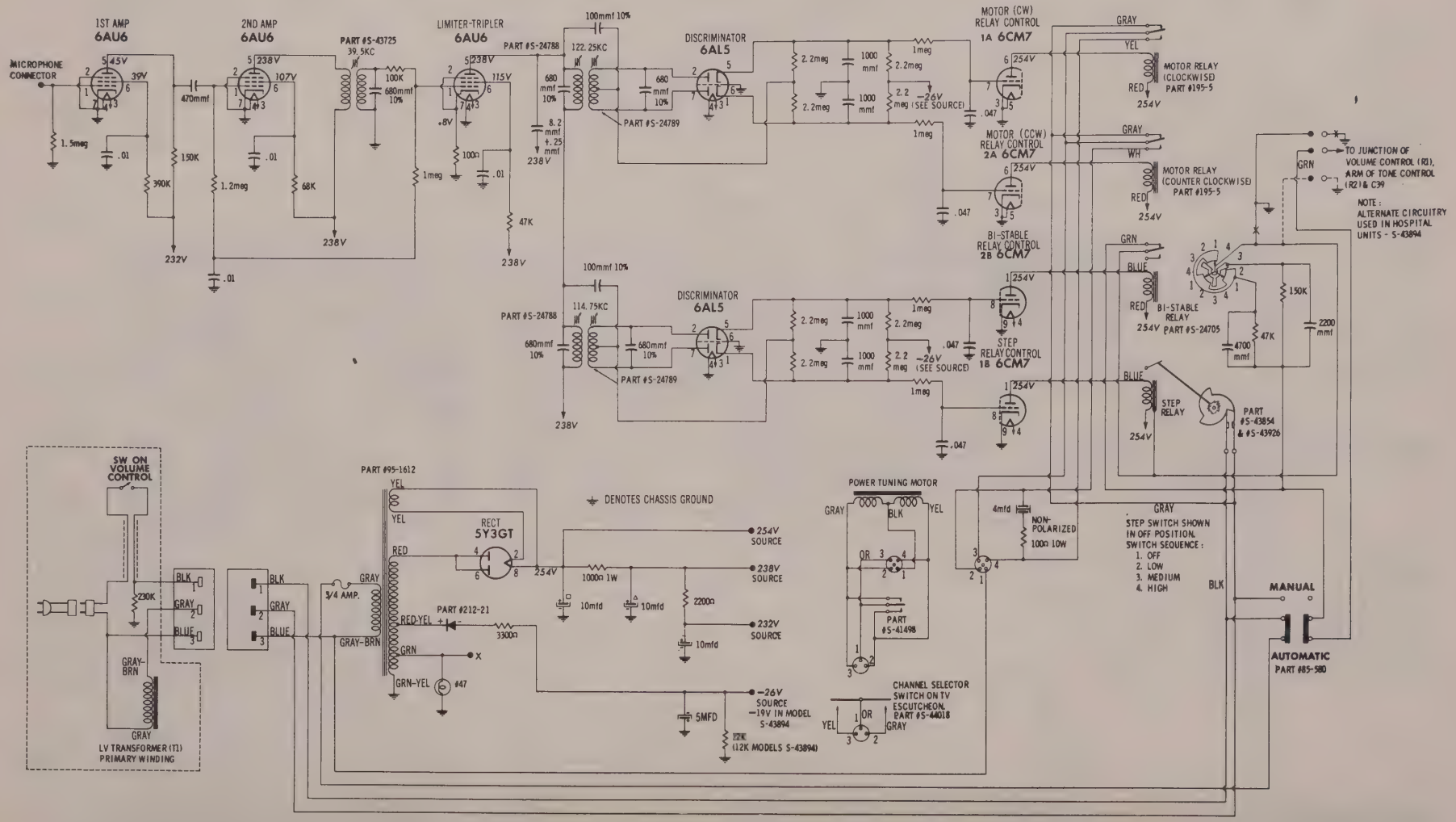
AMPLIFIER CHASSIS 5B26

ZENITH CHASSIS 17B20, Q, U, UD, 17B21Q, 17B22, 5B26



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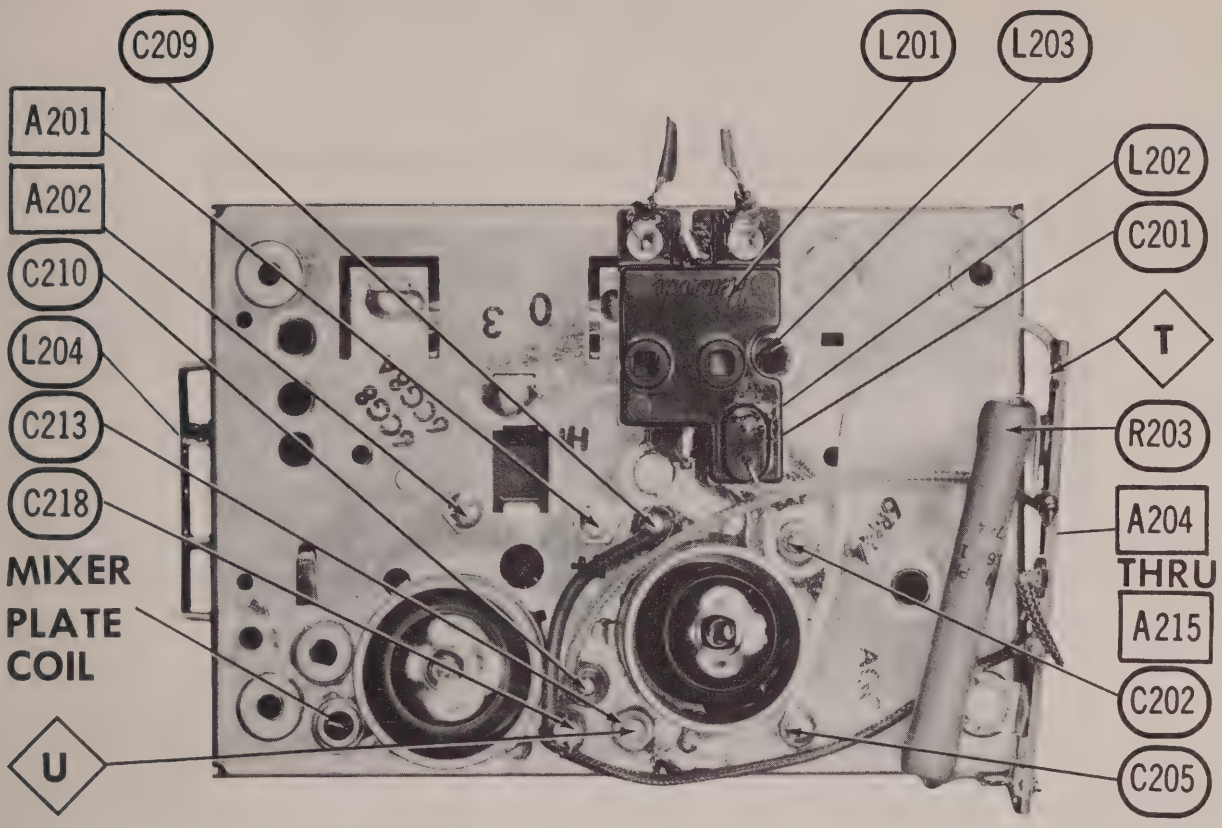
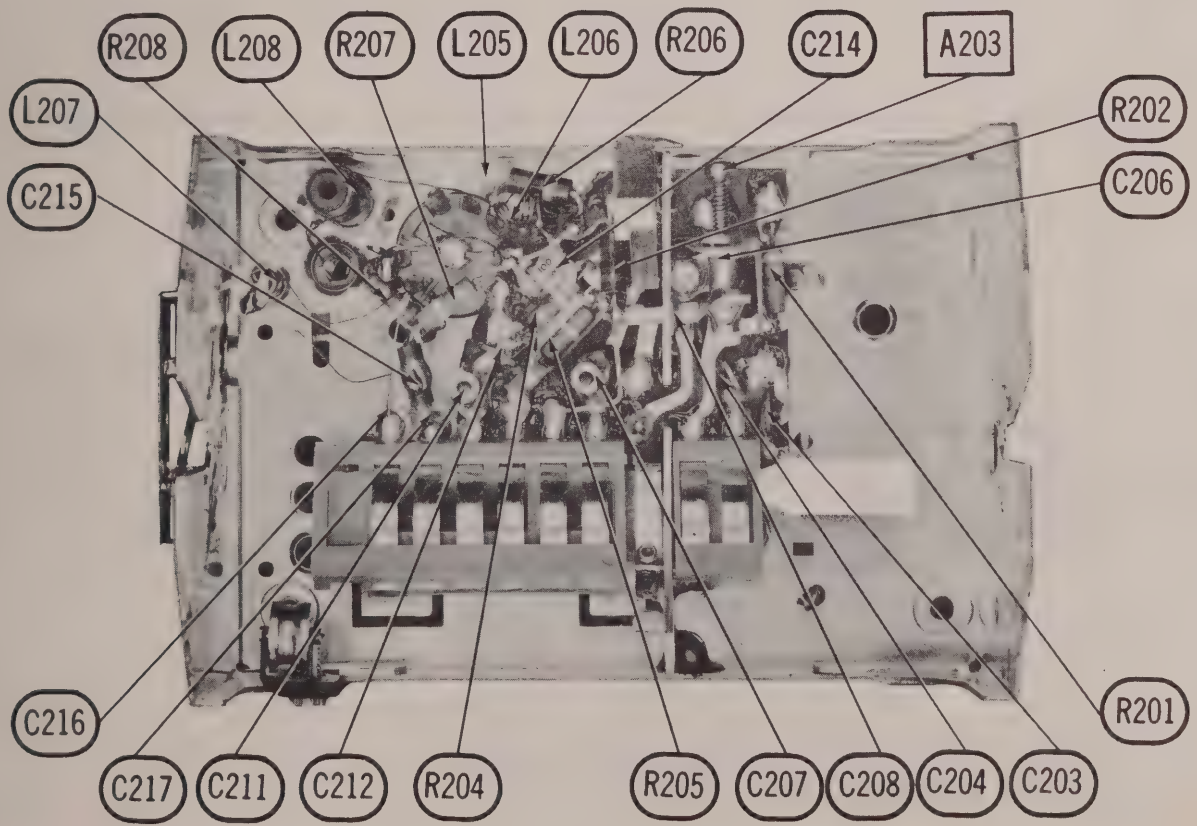
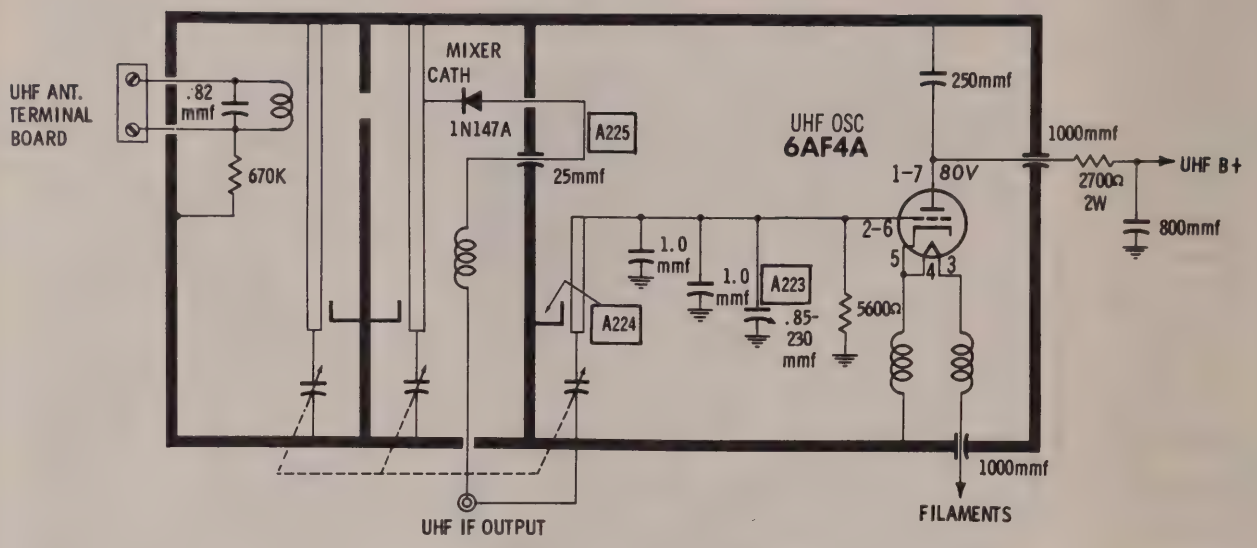
REMOTE CHASSIS S-53724, S-43894



TUNER S-42842 - TOP VIEW



TUNER S-42842 - BOTTOM VIEW



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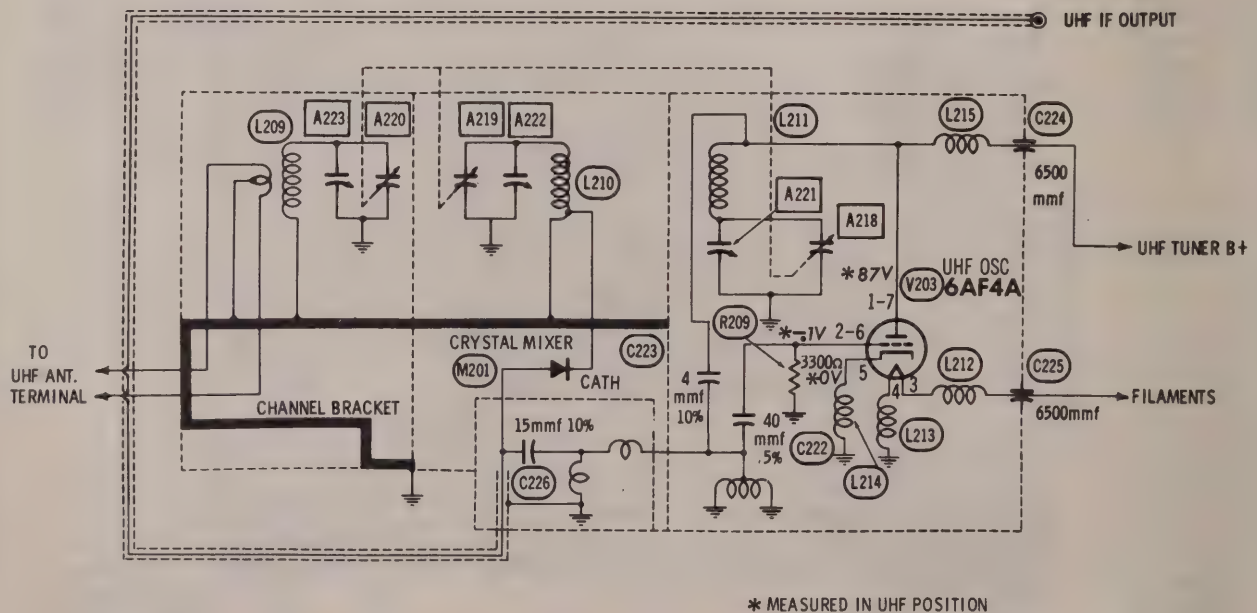
UHF TUNER 175-2



* MEASURED IN UHF POSITION

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UHF TUNER 175-4

TUNER PARTS LIST AND DESCRIPTIONS 175-102

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BK7A	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6U8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C201	12		22-2679	SI 12	D6-120	LT6Q12	GP-12	UC-5412	5GA-Q12	
C202	18	1000	22-2680							5%
C203	18	1000	22-2680							5%
C204	12		22-2679	SI 12	D6-120	LT6Q12	GP-12	UC-5412	5GA-Q12	
C205	3.3		22-2343	NPO-SI 3.3	TCZ-3R3	C10V33C	TCO-3.3	ZT-5533	5TCCB-V33	
C206	8.2		22-2681	NPO-SI 8.2		C10V82C	TCO-8.2			NPO 5%
C207	1.8		22-2428							
C208	1000		22-2889	EF-001	MFT-1000				503C-D1	
C209	1000		22-2889	EF-001	MFT-1000				503C-D1	
C210	25		22-2671	N750-SI 2.5	TCN-25	C10Q25U	TC7-25		5TCU-Q25	N750 10%
C211	1000		22-2889	EF-001	MFT-1000				503C-D1	
C212	1.0		22-2720	NPO-SI1.0	TCZ-1		TCO-1		5TCCB-V1	
C213	1.0		22-2714							N1500 10%
C214	5		22-2716							N330 5%
C215	5		22-2716							N330 5%
C216	1000		22-2889	EF-001	MFT-1000				503C-D1	
C217	1000		22-2889	EF-001	MFT-1000				503C-D1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

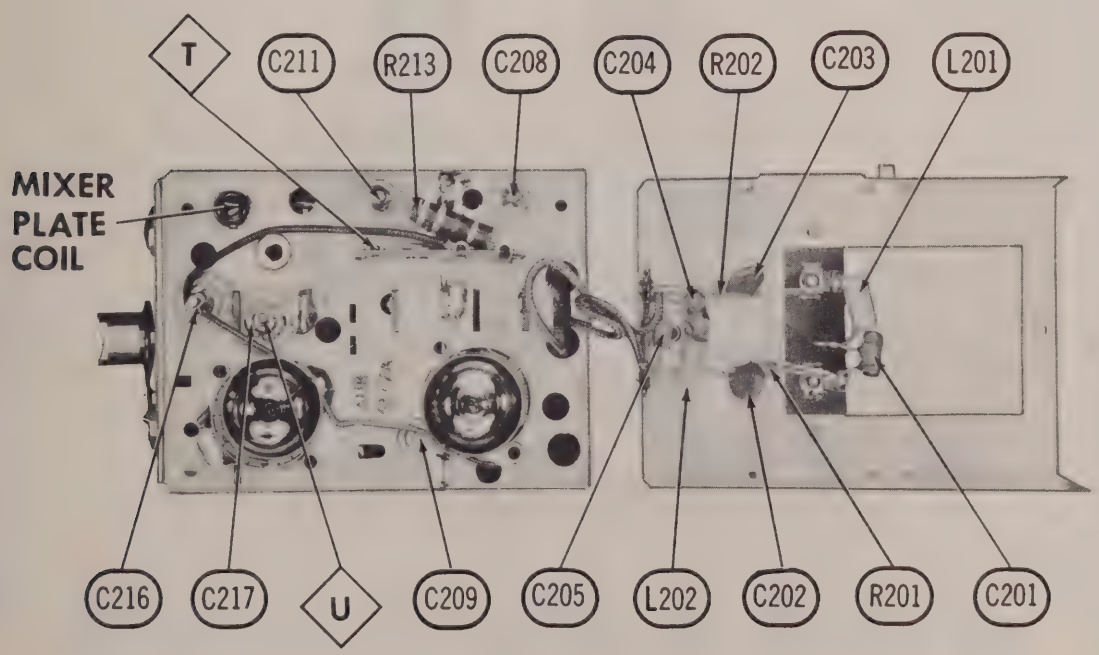
ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R201	230K			
R202	230K			
R203	22K			
R204	2.2meg			
R205	120K			
R206	100K			
R207	1200Ω			

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R208	100K			
R209	100K			
R210	10K			
R211	10K	2	63-3176	
R212	4700Ω			
R213	470Ω	2	63-2398	

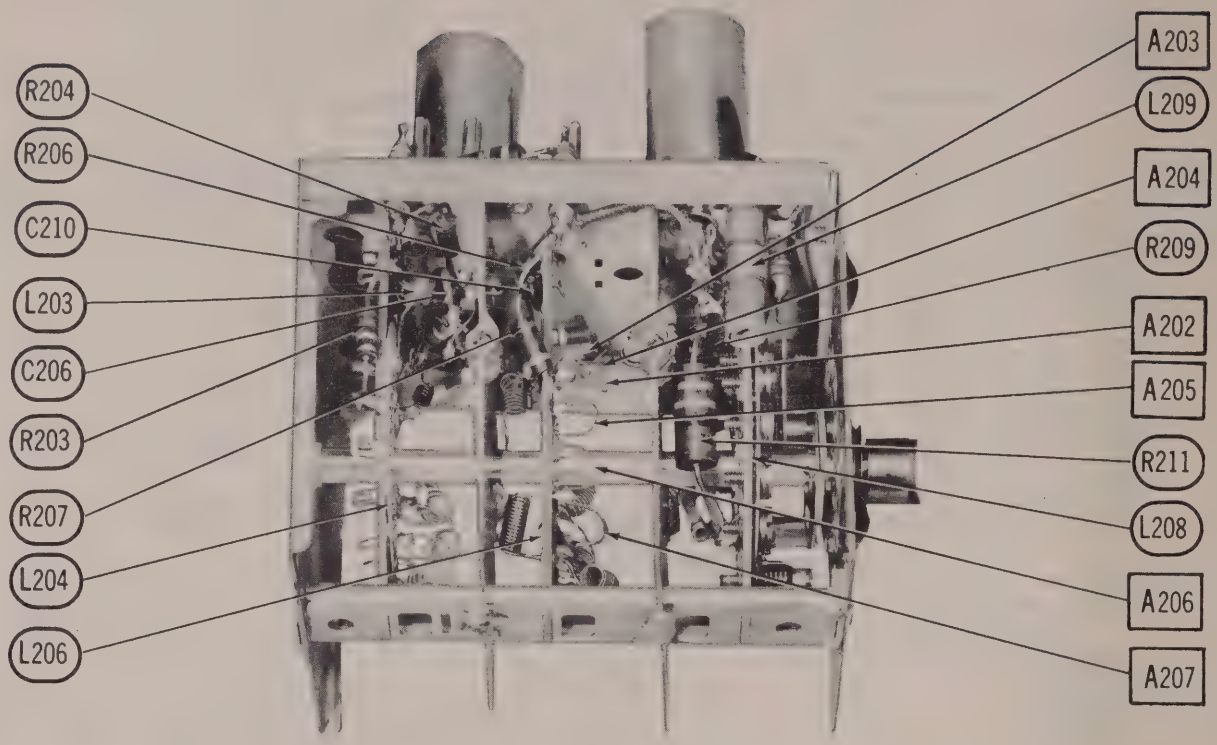
COILS (RF-IF)

ITEM No.	USE	ZENITH PART No.	NOTES
L201	IF Trap Coil	20-567	
L202	IF Trap Coil	20-567	
L203	Ant. Trans.	S-24644	Alt. part #24645
L204	Ant. Coils	S-23641	Channel 2-13 Wafer Assy.
L205	Neut. Coil	20-633	

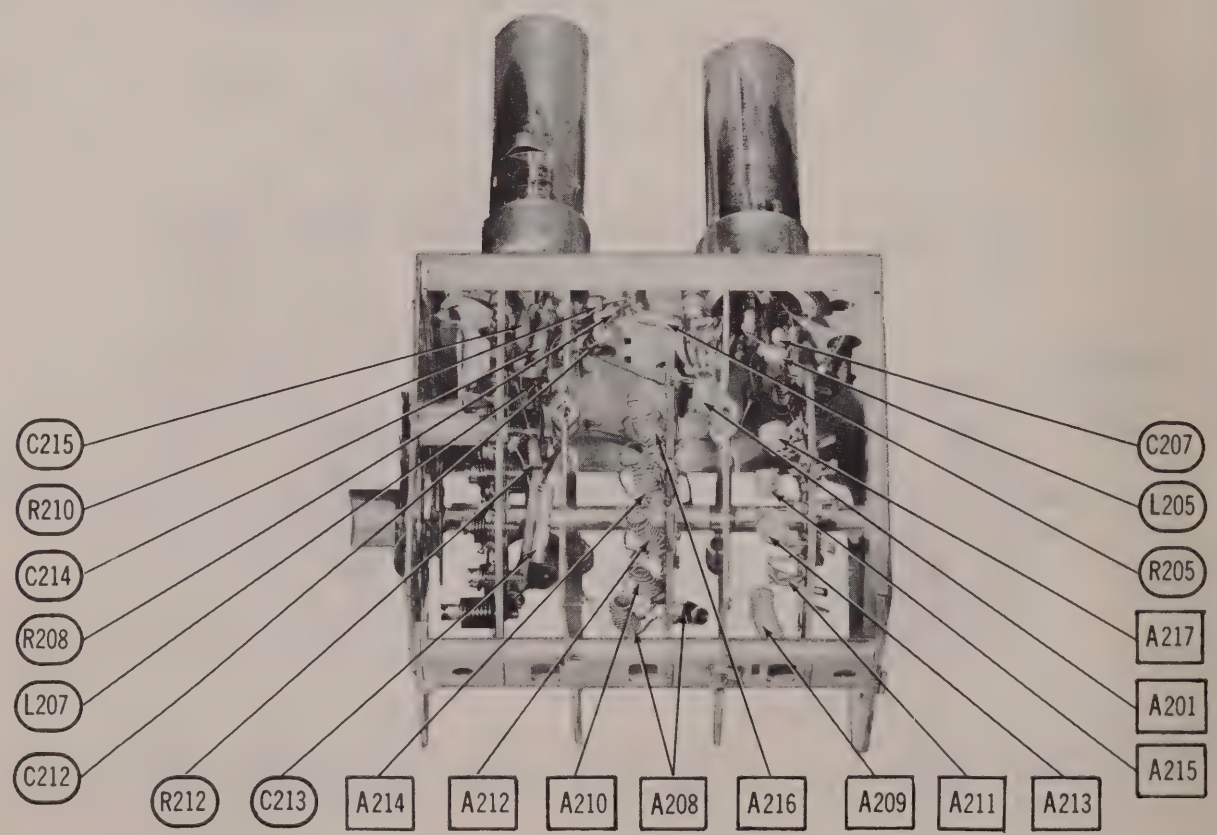
ITEM No.	USE	ZENITH PART No.	NOTES
L206	RF Coils	S-23640	Channel 2-13 Wafer Assy.
L207	Mixer Screen Coil	20-632	
L208	Osc. Coils	S-41807	Channel 2-13 Wafer Assy.
L209	Mixer Plate Coil	S-41665	



TUNER 175-102 - TOP VIEW



TUNER 175-102 - LEFT SIDE



TUNER 175-102 - RIGHT SIDE

TUNER ALIGNMENT INSTRUCTIONS (Con't)

UHF ALIGNMENT FOR TUNER 175-2

Alignment of the UHF tuner should not be attempted without the proper test equipment.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough generator output to provide a usable indication on VTVM.
Adjust A222 for the most satisfactory picture with MINIMUM noise on any UHF station.
Remove the AGC cable between the tuners at the UHF tuner socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	Two 120Ω Carbon Resistors	Across UHF antenna terminals with 120Ω in each lead.	473.5MC (Unmod)	14	DC probe to point ⓥ. Common to chassis.	A223	Adjust for maximum deflection.
5.	"	"	887.5MC	83	"	A224	"

6. The Oscillator Pickup coil (A225) is the short wire connected to the crystal inside the oscillator tuning gang section. Oscillator injection is changed by moving the wire in or out of the oscillator section of the tuning gang. Set tuning gang at mid-range. Connect the negative lead of a 0-50 microammeter thru 5600Ω to point ⓥ. Positive to chassis.
Remove B+ at point ⓦ and note reading. Apply B+ and note reading. The difference between the readings should be between 10 and 40 microamps for proper injection.

TUNER PARTS LIST AND DESCRIPTIONS S-42842

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amplifier	6BN4	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6CG8A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C201	120		22-2922	NPO-DI 120	D6-121	L10T12		5TCC-T12	10%
C202	30		22-2921						5%
C203	28		22-2920						10%
C204	12		22-2919						10%
C205	800		22-2958						
C206	1.0-4.5		22-3009						
C207	5.0-10		22-3006						
C208	47		22-3007						5%
C209	800		22-2958						
C210	800		22-2958						
C211	1.0-4.5		22-3009						
C212	47		22-2915						10%
C213	30		22-2916						
C214	1000		22-2993	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C215	1000		22-3058	EF-001	MFT-1000			503C-D1	
C216	7.5		22-3026						N150 ± .25mmf
C217	18		22-3025						N220 10%
C218	800		22-2958						

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R201	4700Ω			
R202	1000Ω			
R203	5600Ω	7	63-3986	
R204	3900Ω			

ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R205	220K			
R206	10K			
R207	3900Ω			
R208	3900Ω			

COILS (RF-IF)

ITEM No.	USE	ZENITH PART No.	NOTES
L201	Ant. Trans.	S-41511	Includes L202 & C201
L202	IF Trap Coil	20-657	
L203	IF Trap Coil	S-40497	
L204A	Ant, RF, Mixer Grid, Osc. Coils	S-40472	Channel 2
B	"	S-40473	Channel 3
C	"	S-40474	Channel 4
D	"	S-40475	Channel 5
E	"	S-40476	Channel 6
F	"	S-40477	Channel 7
G	"	S-40478	Channel 8

ITEM No.	USE	ZENITH PART No.	NOTES
L204H	Ant., RF, Mixer Grid, Osc. Coils	S-40479	Channel 9
I	"	S-40490	Channel 10
J	"	S-40491	Channel 11
K	"	S-40492	Channel 12
L	"	S-40493	Channel 13
L205	Fil. Choke	20-734	
L206	RF Choke	20-721	
L207	Fine Tuning Coil	S-43559	
L208	Mixer Plate Coil	S-42968	

TUNER PARTS LIST AND DESCRIPTIONS

S – 42843

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BN4	
V202	Mixer-Osc.	6CG8A	

ITEM No.	USE	TYPE	NOTES
V203	UHF Osc.	6AF4A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	120		22-2922	DI 120	DD-121	L10T12	CNO-312	5TCC-T12	10%
C202	30		22-2921						5%
C203	28		22-2920						10%
C204	12		22-2919						10%
C205	800		22-2956	EF-001	MFT-1000			503C-D1	
C206	5-10		22-3006						
C207	1-4.5		22-3009		829-4		CT551		
C208	47		22-3007						
C209	800		22-2918	EF-001	MFT-1000			503C-D1	
C210	800		22-2956	EF-001	MFT-1000			503C-D1	
C211	47		22-2915						10%
C212	1-4.5		22-3009		829-4		CT551		
C213	30		22-2916						
C214	1000		22-2993	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C215	18		22-3025						N220 10%
C216	7.5		22-3026						N150 ±.25mmf
C217	1000		22-2959	BPD-001	DD-102	BYA6D1	B-110	5HK-D1	
C218	800		22-2956	EF-001	MFT-1000			503C-D1	
C219	10		22-2991	NPO-DI 10	DTZ-10	CTA6Q1C	CNO-410	5TCC-Q1	NPO ±.5mmf
C220	1000		22-2959	BPD-01	DD-103	BYA6D1	B-210	5HK-D1	
C221	1000		22-2959	BPD-01	DD-103	BYA6D1	B-210	5HK-D1	
C222	40		22-2519						10%
C223	4		22-2454						±.5mmf
C224	6500		22-2652						
C225	6500		22-2652						
C226	15		22-2561						10%

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ZENITH PART No.	NOTES
	OHMS	WATT		
R201	4700Ω		63-1856	
R202	1000Ω		63-1876	
R203	3900Ω		63-1810	
R204	220K		63-1884	
R205	10K		63-1828	

ITEM No.	RATING		ZENITH PART No.	NOTES
	OHMS	WATT		
R206	3900Ω		63-1810	
R207	3900Ω		63-1810	
R208	220K		63-1884	
R209	3300Ω		63-1806	

COILS (RF-IF)

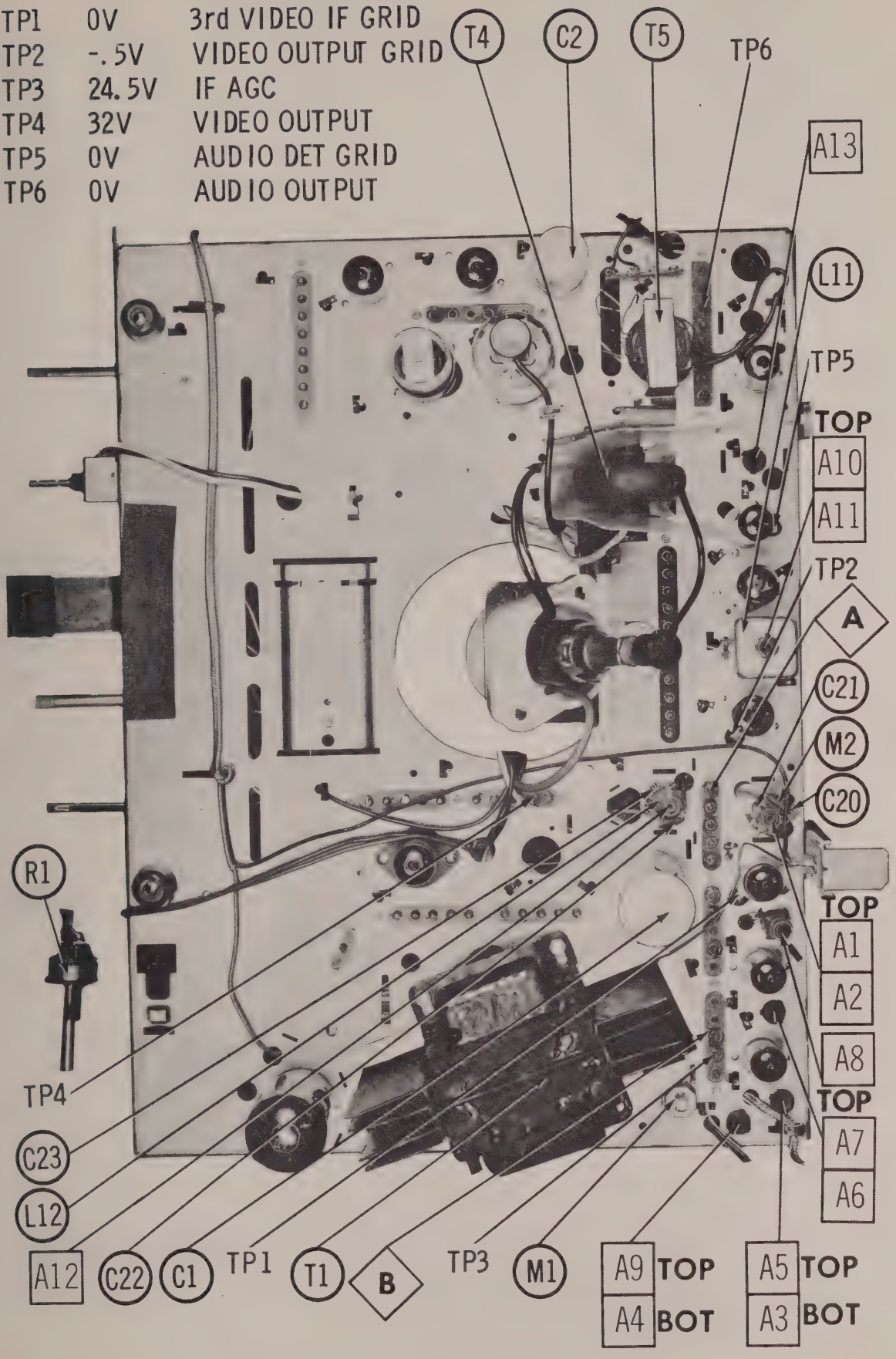
ITEM No.	USE	ZENITH PART No.	NOTES
L201	VHF Ant. Trans.	S-41511	
L202	RF Choke	20-657	
L203	IF Trap	S-40497	
L204A	Ant., RF, Mixer Grid, Osc. Coils	S-40472	Channel 2
B	"	S-40473	Channel 3
C	"	S-40474	Channel 4
D	"	S-40475	Channel 5
E	"	S-40476	Channel 6
F	"	S-40477	Channel 7
G	"	S-40478	Channel 8
H	"	S-40479	Channel 9
I	"	S-40490	Channel 10
J	"	S-40491	Channel 11
K	"	S-40492	Channel 12

ITEM No.	USE	ZENITH PART No.	NOTES
L204L	Ant., RF, Mixer Grid, Osc. Coils	S-40493	Channel 13
M	UHF IF Coils	S-41661	
L205	Fil. Choke	20-734	
L206	RF Choke	20-721	
L207	Mixer Plate	S-42968	
L208	Fine Tuning	20-733	
L209	UHF Ant. Tuning	S-19685	
L210	UHF Mixer Tuning	S-19685	
L211	UHF Osc. Tuning	S-19685	
L212	Fil. Choke	20-607	
L213	Fil. Choke	20-507	
L214	Cathode Choke	20-506	
L215	RF Choke	20-504	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ZENITH PART No.	CBS PART No.	SYLVANIA PART No.	
M201	1N147A	103-15	1N82A	1N82A	UHF Mixer (Pigtail)

TP1	0V	3rd VIDEO IF GRID
TP2	-.5V	VIDEO OUTPUT GRID
TP3	24.5V	IF AGC
TP4	32V	VIDEO OUTPUT
TP5	0V	AUDIO DET GRID
TP6	0V	AUDIO OUTPUT



CHASSIS-TOP VIEW

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	1.1meg	1500Ω	.1Ω	0Ω	††240Ω	††240Ω	1500Ω		
V2	6BZ6	60K	††22Ω	.1Ω	0Ω	†220Ω	†220Ω	INF		
V3	6DK6	.1Ω	120Ω	.1Ω	0Ω	†8200Ω	†8200Ω	0Ω		
V4	6EB8	0Ω	100K	†150K	.1Ω	0Ω	15Ω	2700Ω	†22K	●†5600Ω
V5	6BU8	●6500Ω	†17K	570K	.1Ω	0Ω	†150K	†350K	†33K	†8.2meg
V6	6BN6	● 230Ω	.2Ω	.1Ω	0Ω	†27K	4.6Ω	†390K		
V7	6AQ5A	0Ω	680Ω	.1Ω	0Ω	†1260Ω	†470Ω	0Ω		
V8	6CY7	†450Ω	2.2meg	2.2meg	0Ω	.1Ω	●†4.3meg	● 500K	0Ω	1000Ω
V9	6CN7	0Ω	660K	330K	0Ω	.1Ω	390Ω	1.6meg	†68K	
V10	6CG7	†230K	39K	0Ω	0Ω	.1Ω	†0Ω	32K	22K	NC
V11	6DQ6A	TP	.1Ω	NC	†10K	1meg	TP	0Ω	0Ω	TOP CAP †16Ω
V12	6AX4GT	NC	TP	†140K	NC	†0Ω	NC	0Ω	.1Ω	
V13	1J3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP †266Ω
V14	5U4GB	NC	¶	TP	29Ω	NC	26Ω	TP	¶	
V15	21CXP4	.1Ω	27K	PIN 6 ●490K	PIN 10 †70K	PIN 11 ●170K	PIN 12 0Ω			
V201	6BN4	0Ω	2.8meg	0Ω	.1Ω	†6600Ω	0Ω	2.8meg		
V202	6CG8A	3900Ω	†9500Ω	0Ω	0Ω	.1Ω	†5600Ω	†15K	0Ω	230K
V203	6AF4A	*†8200Ω	*3300Ω	.2Ω	.1Ω	*.1Ω	*3300Ω	*†8200Ω		
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

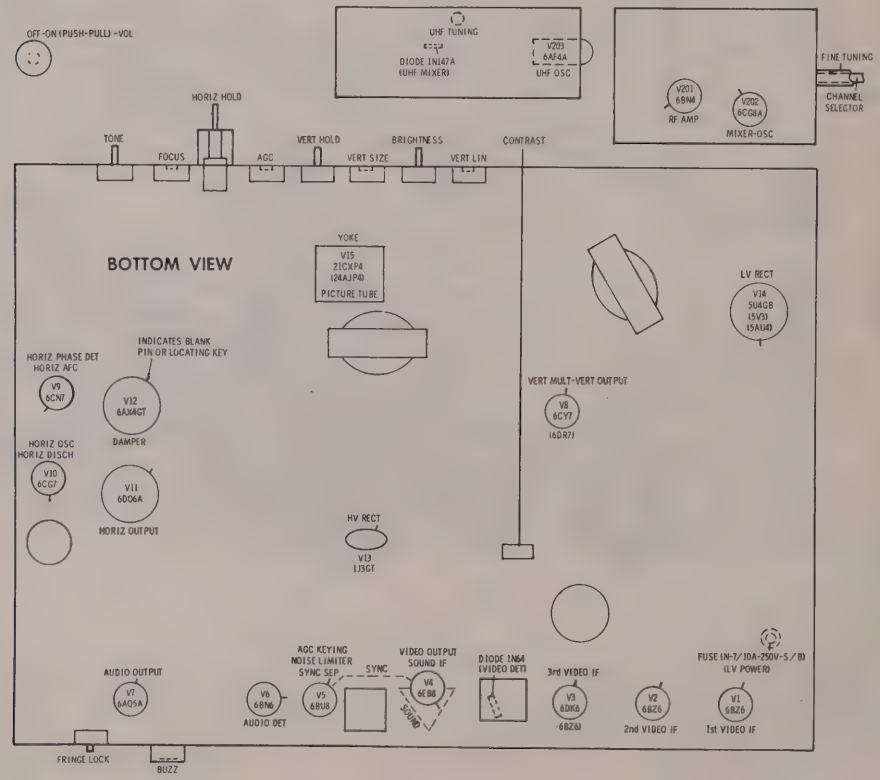
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.

† MEASURED FROM 265V SOURCE. * MEASURED IN "UHF" POSITION.

†† MEASURED FROM PIN 7 OF V2. NC NO CONNECTION.

‡ MEASURED FROM PIN 3 OF V12. TP TIE POINT.



TUBE PLACEMENT CHART

PHOTOFACT* Folder with CIRCUITRACE*

ARVIN MODEL 8584 (Ch. 1.44600)

ARVIN MODEL
8584 (Ch. 1.44600)

TRADE NAME	Arvin Model 8584 (Ch. 1.44600)
MANUFACTURER	Arvin Industries, Inc., Columbus, Indiana
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	6 Volts DC
TUNING RANGE—BROADCAST	540 - 1620KC
RATING	6MA@6 Volts DC (No Signal, Min. Volume) 8MA@6 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

Suggested alignment tools:
A1, A2, A3.....General Cement #5008, 8195, 8728, 8988, 8989
Walsco #2531, 2532
A5.....General Cement #8606, 8606L
Walsco #2543, 2544
A4, A6.....General Cement #8607, 8290, 8821, 9105, 9106, 5008, 8276, 5000, 5003
Walsco #2515, 2538, 2525, 2520, 2522, 2512, 2537, 2523, 2534

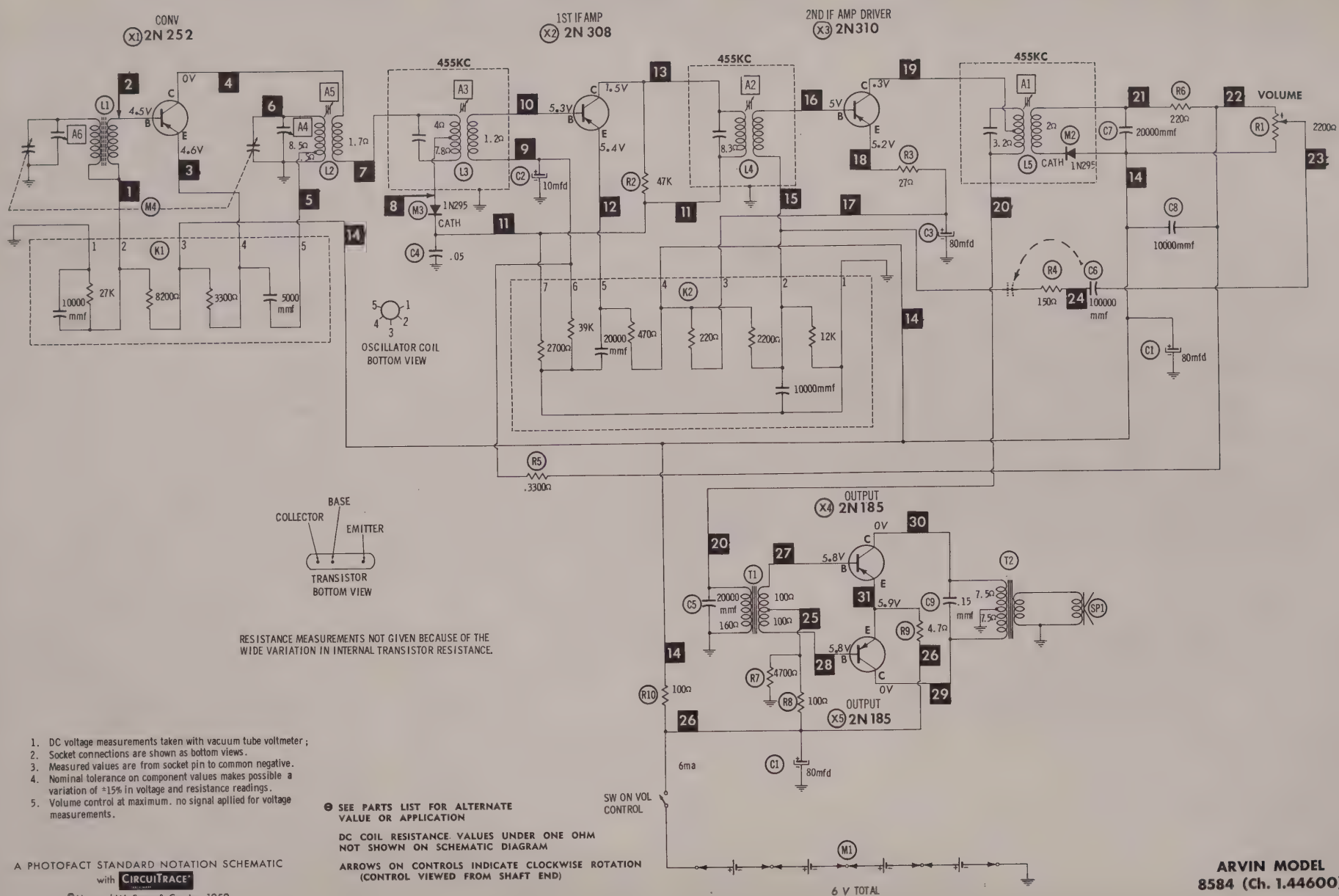
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1600KC	1600KC	"	A4	"
3.		"	600KC	600KC	"	A5	Adjust for maximum output while rocking tuning gang. Repeat Steps 2 & 3.
4.		"	1400KC	Tune for 1400KC signal	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of H842

the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

SET 429 FOLDER 3


CONV
X1 2N 252
1ST IF AMP
X2 2N 308
2ND IF AMP DRIVER
X3 2N310
455KC
455KC
455KC
VOLUME
OSCILLATOR COIL
BOTTOM VIEW
TRANSISTOR
BOTTOM VIEW
BASE
COLLECTOR
EMITTER
OUTPUT
X4 2N185
OUTPUT
X5 2N185
SW ON VOL
CONTROL
6 V TOTAL
RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE
WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
1. DC voltage measurements taken with vacuum tube voltmeter ;
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal applied for voltage measurements.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE
©Howard W. Sams & Co , Inc. 1959
ARVIN MODEL
8584 (Ch. 1.44600)

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N252	Converter			2N486	2N140	PNP
X2	2N308	1st IF Amplifier			2N483	2N139	PNP
X3	2N310	2nd IF Amp. -AF Driver			2N482	2N139	PNP
X4	2N185	Output		2N408	2N632	2N270	PNP
X5	2N185	Output		2N408	2N632	2N270	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	10	45719-1						VL-2350
B	80	10							
C2	10	10	44396-4	PWE10010	NL10-10	TT12X10	ML10-15		TE-1114
C3	80	10	44396-5	PWE10100	NL100-10	TT15X100			TE1119.3

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	.05	100							
C5	20000							TG-P10	
C6	100000								
C7	20000							TG-S10	
C8	10000								
C9	.15	100							

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2200Ω	½	45250-4					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ARVIN PART No.	NOTES
	OHMS	WATT		
R2	47K			
R3	27Ω			
R4	150Ω			
R5	3300Ω			
R6	220Ω			

ITEM No.	RATING		ARVIN PART No.	NOTES
	OHMS	WATT		
R7	4700Ω			
R8	100Ω			
R9	4.7Ω			
R10	100Ω			

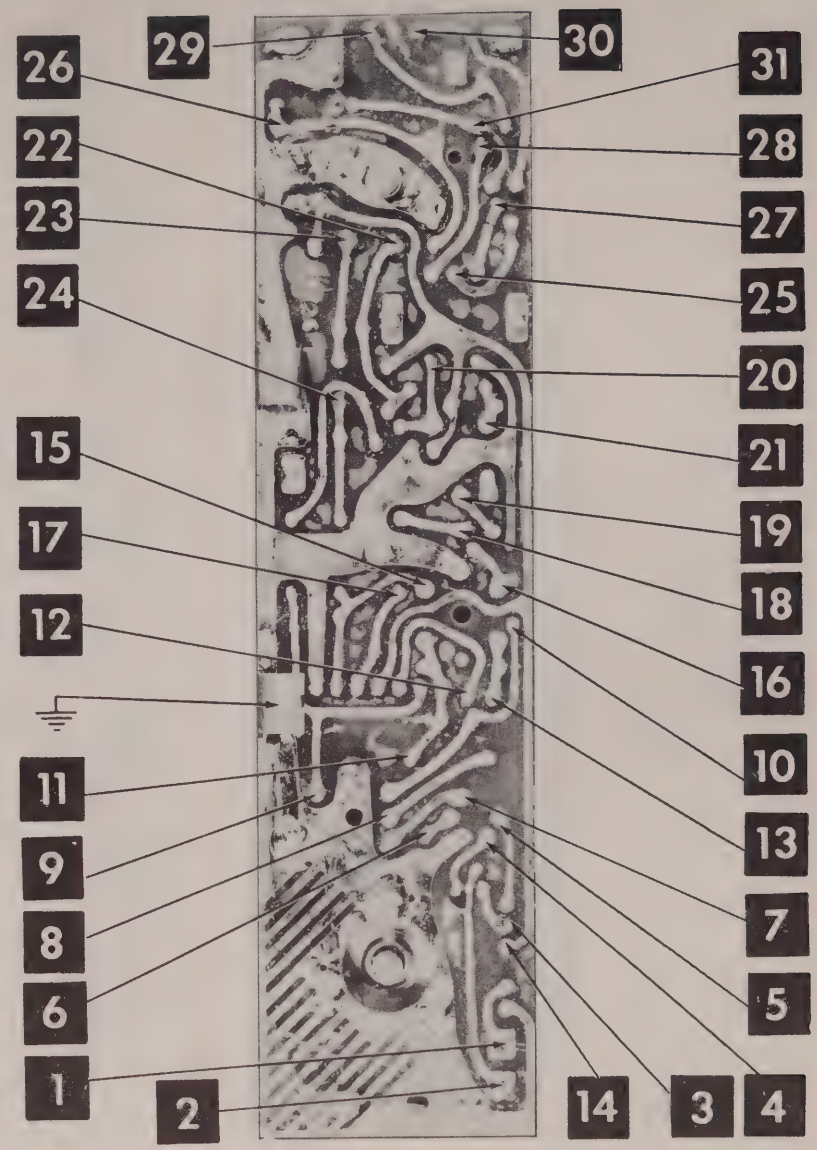
COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		ARVIN PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	45478-93①					
L2	Osc. Coil	45783-4					
L3	1st IF	45900-2					
L4	2nd IF	45900-3					
L5	3rd IF	45900-4					

① Includes handle assembly. Part #45478-55 used with blue cabinets.

PRINTED BOARD

A Howard W. Sams CIRCUITRACE® Photo



PARTS LIST AND DESCRIPTIONS (cont)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ARVIN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1	: 1	45604-2				TR-1 ①		① Use original channel frame.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ARVIN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	250Ω CT	3-4Ω	45838-1						TY-57X①	① Use original channel frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ARVIN PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	45600-2	4A07	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ARVIN PART No.	REPLACEMENT DATA
K1	Converter Circuit	10000mmf, 5000mmf, 27K, 8200Ω, 3300Ω	46000-1	
K2	IF Circuit .	20000mmf, 10000mmf, 2700Ω, 39K, 470Ω, 220Ω, 12K	46000-2	

BATTERIES

ITEM No.	VOLTAGE	ARVIN PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	6V			2R ①		950		M-13R	① 4 Used

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ARVIN PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N295		1N60	1N295	Detector (Pigtail)
M3	1N295		1N60	1N295	Overload (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M4	Tuning Cap.	45789-1	2 Gang, Ant. 14-298mmf, Osc. 5-64mmf
	Printed Board	45726-1	

CABINETS & CABINET PARTS

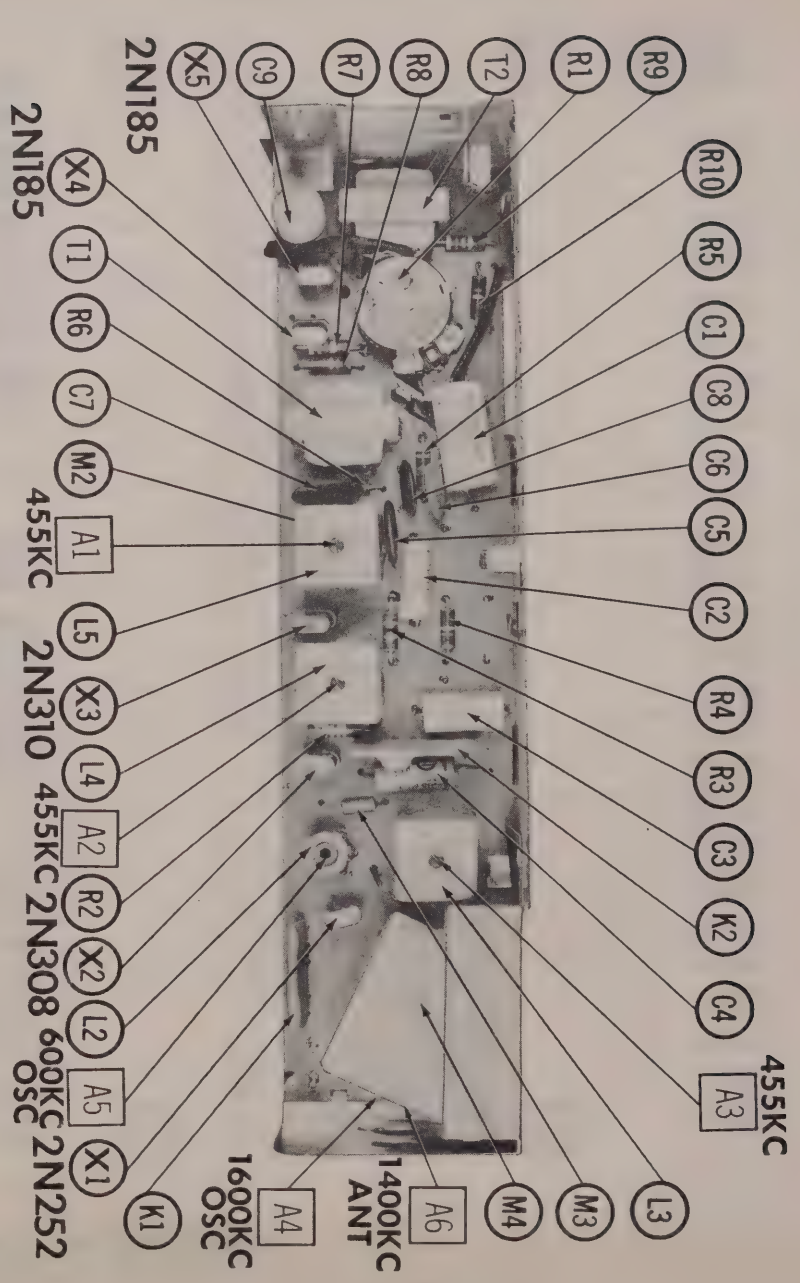
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	45729	Tuning, Clear
Knob	45724-93	Volume-On-Off, Red
Knob	45724-55	Volume-On-Off, Blue
Indicator	45758-93	Station, Red
Indicator	45758-55	Station, Blue
Cabinet	45608-93	Less Handle (L1), Red
Cabinet	45608-55	Less Handle (L1), Blue

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



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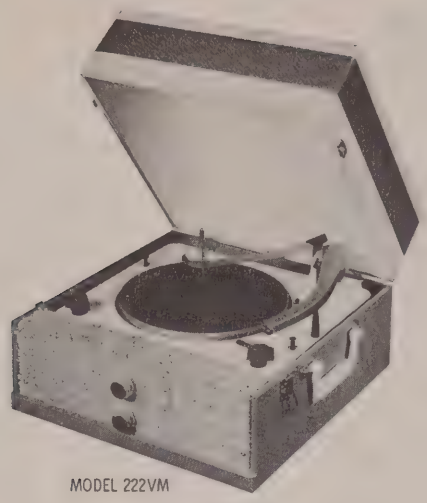
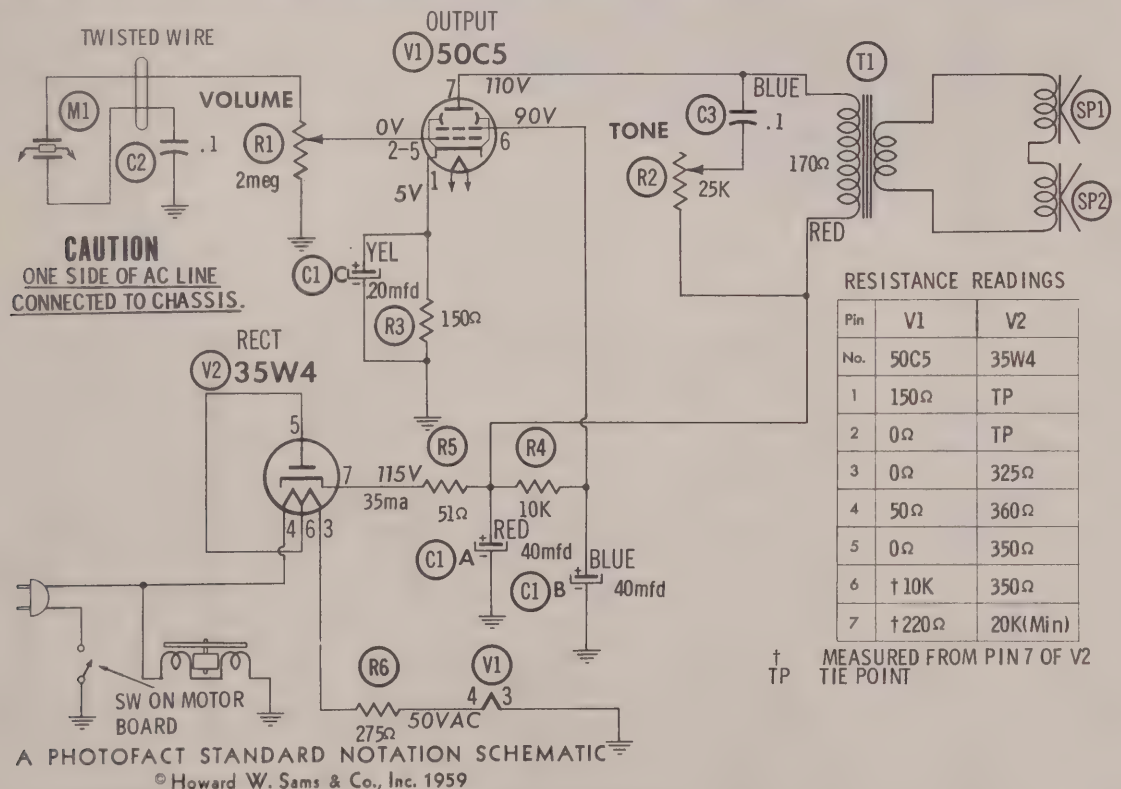


MODEL 222VM

TRADE NAME	Fanfare Models 221BSR, 222VM
MANUFACTURER	Fanon Electronic Sales Corp., 919 Park Place, Brooklyn 13, N. Y.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES	Two
POWER SUPPLY	110-120 Volts AC - 60 Cycles RATING 22 Watts, .23 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER USED IN MODEL 221BSR - SEE SIMILAR MONARCH UA8 - PHOTOFACT SET 381 FOLDER 11.

FOR SERVICE INFORMATION ON RECORD CHANGER USED IN MODEL 222VM - SEE SIMILAR VM1200A - PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10.



RESISTANCE READINGS

Pin No.	V1 50C5	V2 35W4
1	150Ω	TP
2	0Ω	TP
3	0Ω	325Ω
4	50Ω	360Ω
5	0Ω	350Ω
6	†10K	350Ω
7	†220Ω	20K(Min)

† MEASURED FROM PIN 7 OF V2
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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H882

FANFARE MODELS
221BSR, 222VM
SET 429 FOLDER 4

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Output	50C5	

ITEM No.	USE	TYPE	NOTES
V2	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	FANFARE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150		PRS150V404	BBRT44215	TCT3116	TDLT-4	FMT-312	TVA-3448
B	40	150		020					
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	FANFARE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C3	.1	100		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	FANFARE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2meg	½	CM16669	B-76	A47-2meg-Z	Q13-139	U55	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2A	25K	½	CM16667	B-29	A47-25K-W	Q13-120	U28A	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		FANFARE PART No.	NOTES
	OHMS	WATT		
R3	150Ω			
R4	10K			

ITEM No.	RATING		FANFARE PART No.	NOTES
	OHMS	WATT		
R5	51Ω			
R6	275Ω			

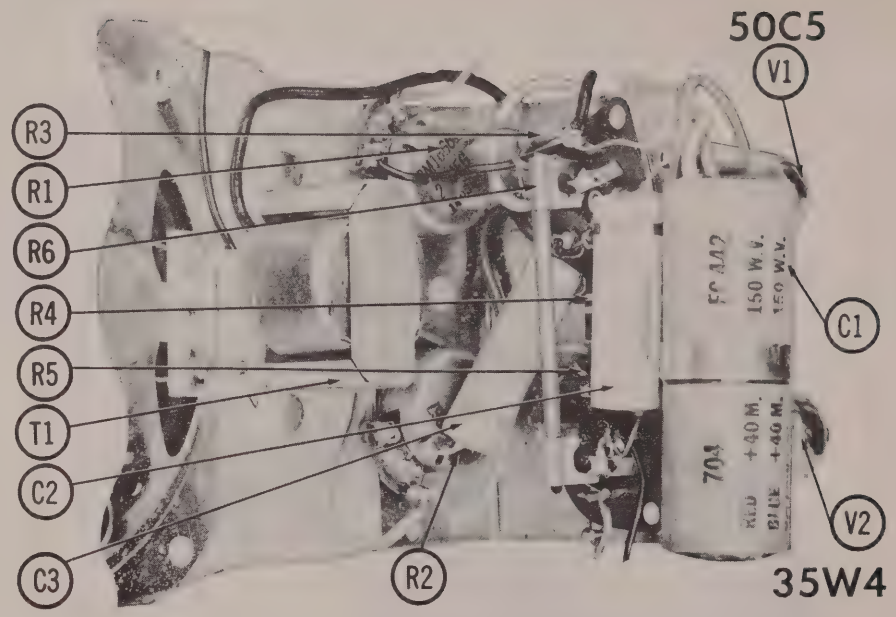
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	FANFARE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3000Ω	3-4Ω	FX313	Z1101	A-3025	AU-605	A-3332	24S53	S-12X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	FANFARE PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω		4A05	
SP2	4"	PM	3-4Ω		4A05	

CHASSIS—BOTTOM VIEW



PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	FANFARE PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		120-TS	N8-1 and N8-3			Model 222V-M
		310-TB	N8-1 and N8-3			Model 221BSR

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	FANFARE PART No.	JENSEN PART No.	WALCO PART No.	
M2	(78RPM)	† CRA-55 or †♦ CRA-55D	† W-64S or ♦ W-64D	† Jewel ♦ Diamond
	(LP)	† CRA-55LP or ♦ CRA-55LPD	† W-64MGS or ♦ W-64MGD	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting) .....Use BELDEN No. 8401

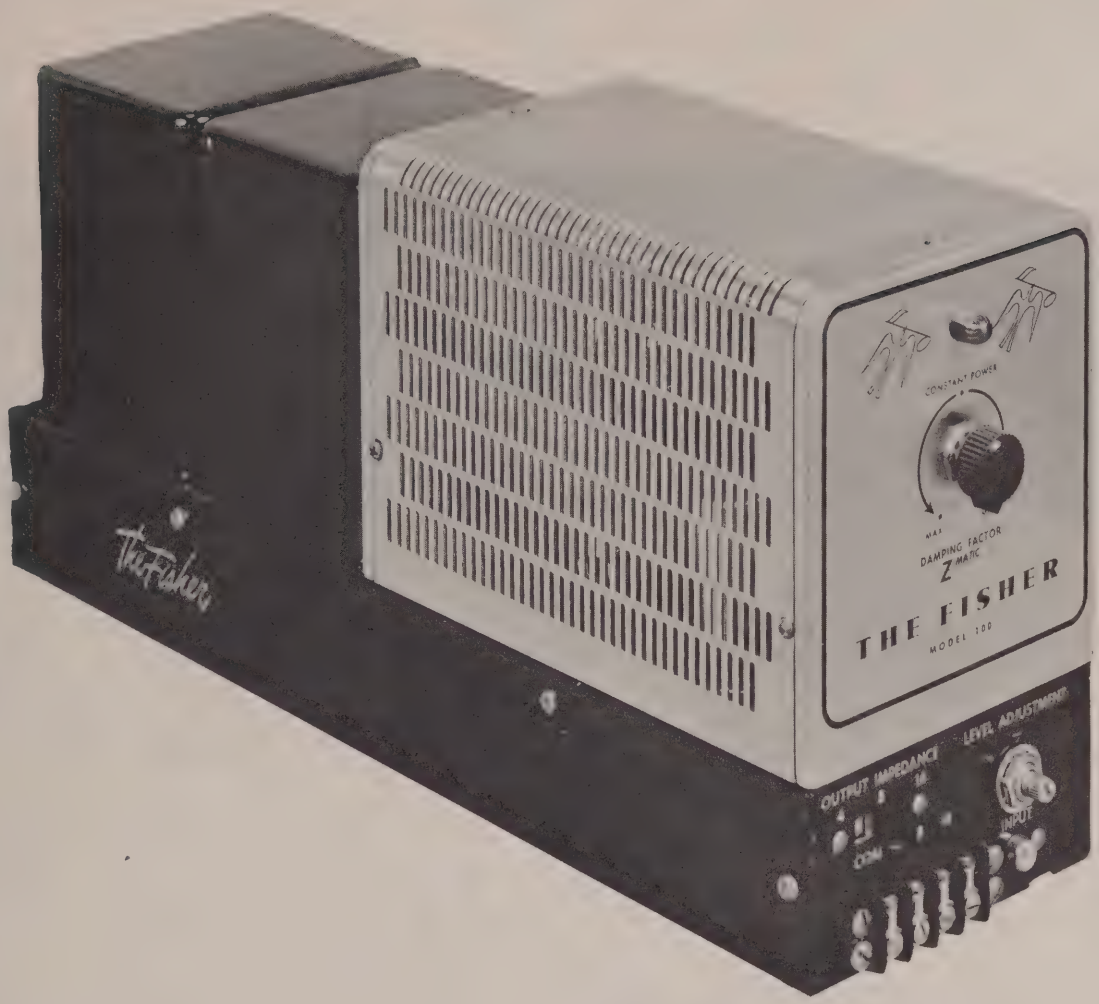
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

FISHER MODEL 100

FISHER MODEL 100



FISHER MODEL 100

TRADE NAME	Fisher Model 100 (Serial #10001-19999 Inclusive)
MANUFACTURER	Fisher Radio Corp., 21-21 44th Drive, Long Island City 1, N. Y.
TYPE SET	AC Operated Audio Amplifier
TUBES	Five
POWER SUPPLY	105-125 Volts AC, 50-60 Cycles RATING 124 Watts, 1.24 Amp. @117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H874

SET 429 FOLDER 5

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	AF Amp. -Phase Inv.	12AT7/ ECC81
V2	Driver	12AU7/ ECC32
V3	Output	6L6G/ EL37 Note 1
V4	Output	6L6G/EL37 Note 1
V5	Rectifier	5V4G

Note 1. Some versions may use 5881 in this application. V3 & V4 must be the same type.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA FISHER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲ 40	500	C-522-114	AFH2-72	B0530	FP288	TMD-62	D-265	TVL-2940
B	▲ 40	500							
C2A	▲ 40	450	C-1798	AFH2-57	B0450	FP238	TMD-54	D-235	TVL-2764
B	▲ 40	450							
C3	50	50	C-508-115	PRS50V50	BR505	TC39	TD-50-50	MT-0550	TVA-1308

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA FISHER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.22	200	C69P224V2	P288N-22		CUB2P22	GEM-2022	2TMP22	
C5	300		CC21GP301K5		MD-301	L10T3			10%
C6	120		CC21GP121K5	NPO-SI120	D6-121	L10T12	CN0-312	5TCC-T12	10%
C7	.022	400	C68P223M4	P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C8	.022	400	C68P223M4	P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C9	.047	400	C68P473M4	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C10	.047	400	C68P473M4	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C11	500			BPD-0005	DD-501	L10T5	B-350	5GA-T5	Note 1
C12	.01	600	C-2747	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FISHER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	R-2815-9	AB-59	A47-500K-S	Q11-133	U50	Input Level Adjustment
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R2A	50K	½	R-50000-5	AB-31	A47-50K-S	Q11-123	U35	Phase Inverter Balance
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R3A	1000Ω	½	R-557-126	AB-5	A47-1000-S		U4	Damping Factor
B	Shaft			AK-8	RS-3/16		Not Req.	
C	Switch			*†KB-3orKR-3	SWE-21 †		US-28 †	Z-Matic

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.
† Use Terminals which are closed (switch on) in maximum CCW position.

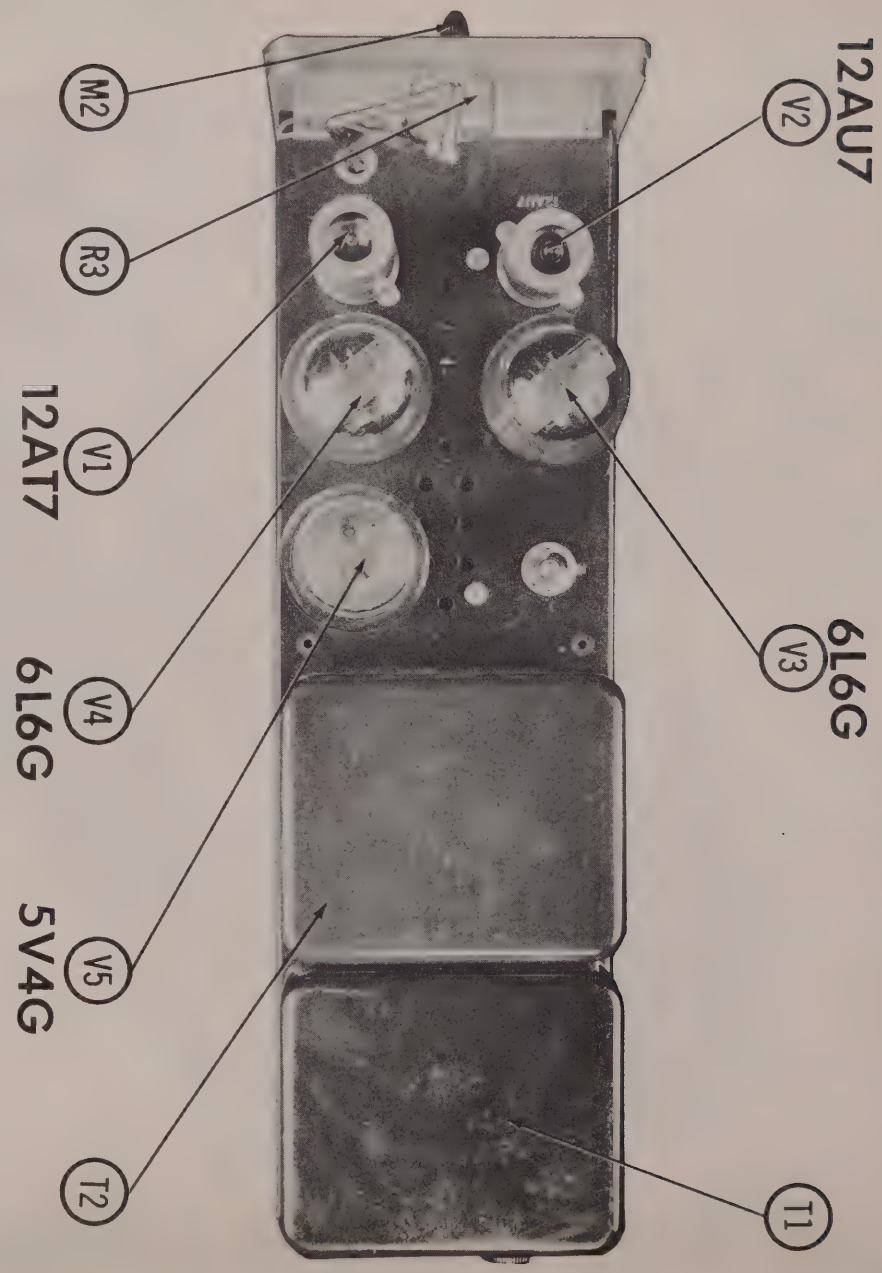
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	FISHER PART No.	NOTES
R4	220K		RC20BF224K	
R5	330K		RC20BF334K	
R6	1500Ω		RC20BF152K	
R7	470Ω		RC20BF472K	
R8	100K		RC20BF104K	
R9	82K		RC20BF823K	
R10	470K		RC20BF474K	
R11	150K		RC20BF154K	
R12	2700Ω		RC20BF272K	
R13	470K		RC20BF474K	
R14	150K		RC20BF154K	
R15	470K		RC20BF474K	

ITEM No.	RATING OHMS	RATING WATT	FISHER PART No.	NOTES
R16	68Ω		RC20BF680K	
R17	470K		RC20BF474K	
R18	68Ω		RC20BF680K	
R19A	240Ω	10		
B	1Ω	5	R-649-117	
C	1Ω	5		
D	100Ω	10		
R20	2200Ω		RC20BF222K	
R21	330Ω		RC20BF331K	
R22	.82Ω	5	R-557-140	
R23	10K	1	RC30BF103K	
R24	10K	1	RC30BF103K	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	FISHER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ 1.24A	780VCT @ .150A	5V @ 2A	T-649-114						
	SEC. 3	SEC. 4	SEC. 5							
	6.3VCT @ 3A									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI. 1	SEC.	FISHER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5000Ω CT	16Ω Tap @ 8Ω, 4Ω	T-557-145							
	PRI 2									
	300Ω CT									

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FISHER PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3A 250V	F-3000	X-1036	312003. (3AG 3A 250V)	342001	AGC3	HKP

MISCELLANEOUS

ITEM No.	PART NAME	FISHER PART No.	NOTES
M2	Lamp	1-557-144	#NE2
M3	Switch	S-557-138	Impedance Matching (3 Position, Slide Type).

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

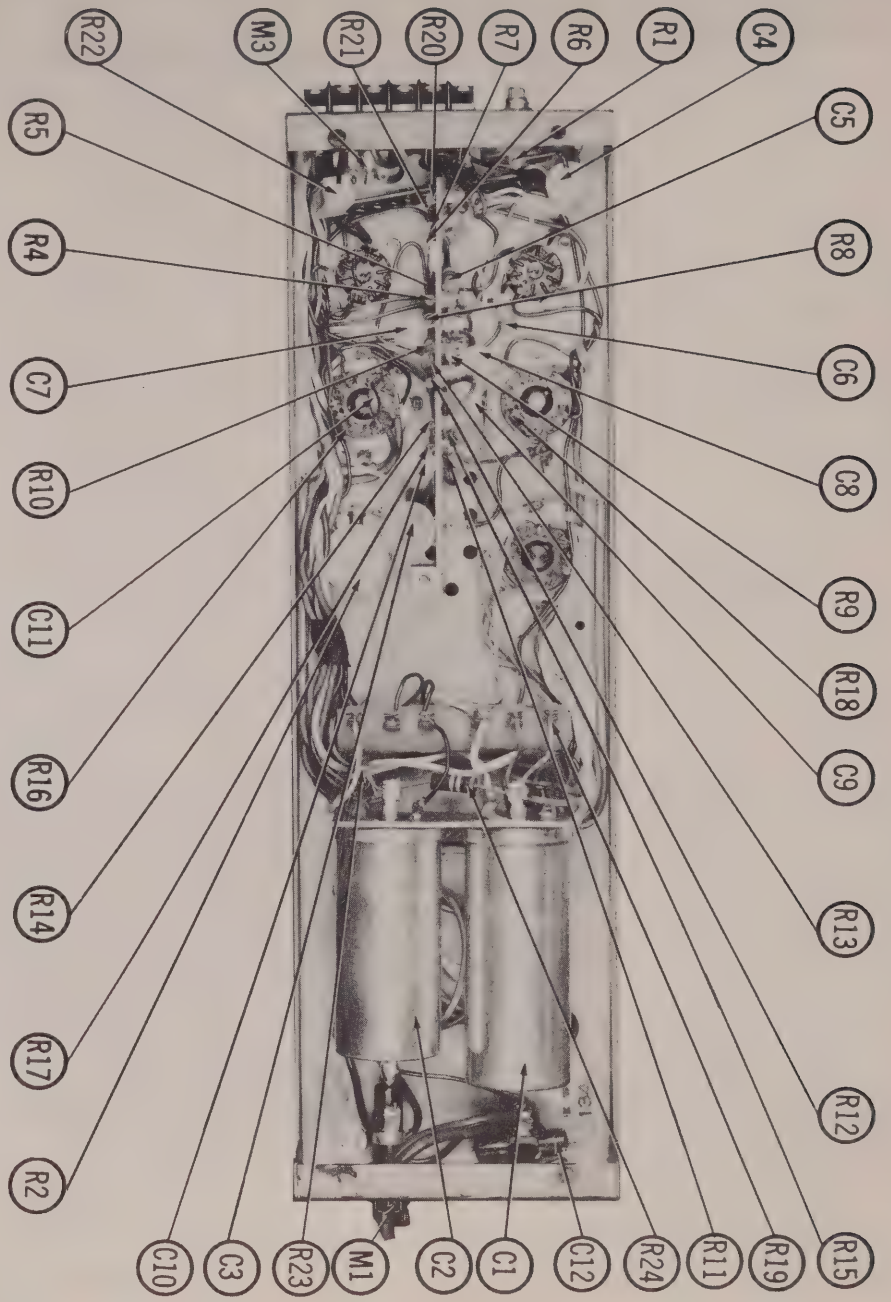
NAME	PART NO.	DESCRIPTION
Knob	E-557-127	Z-Matic Control
Cover	A-557-107	Perforated, Brass
Control Panel	AS-649-103	

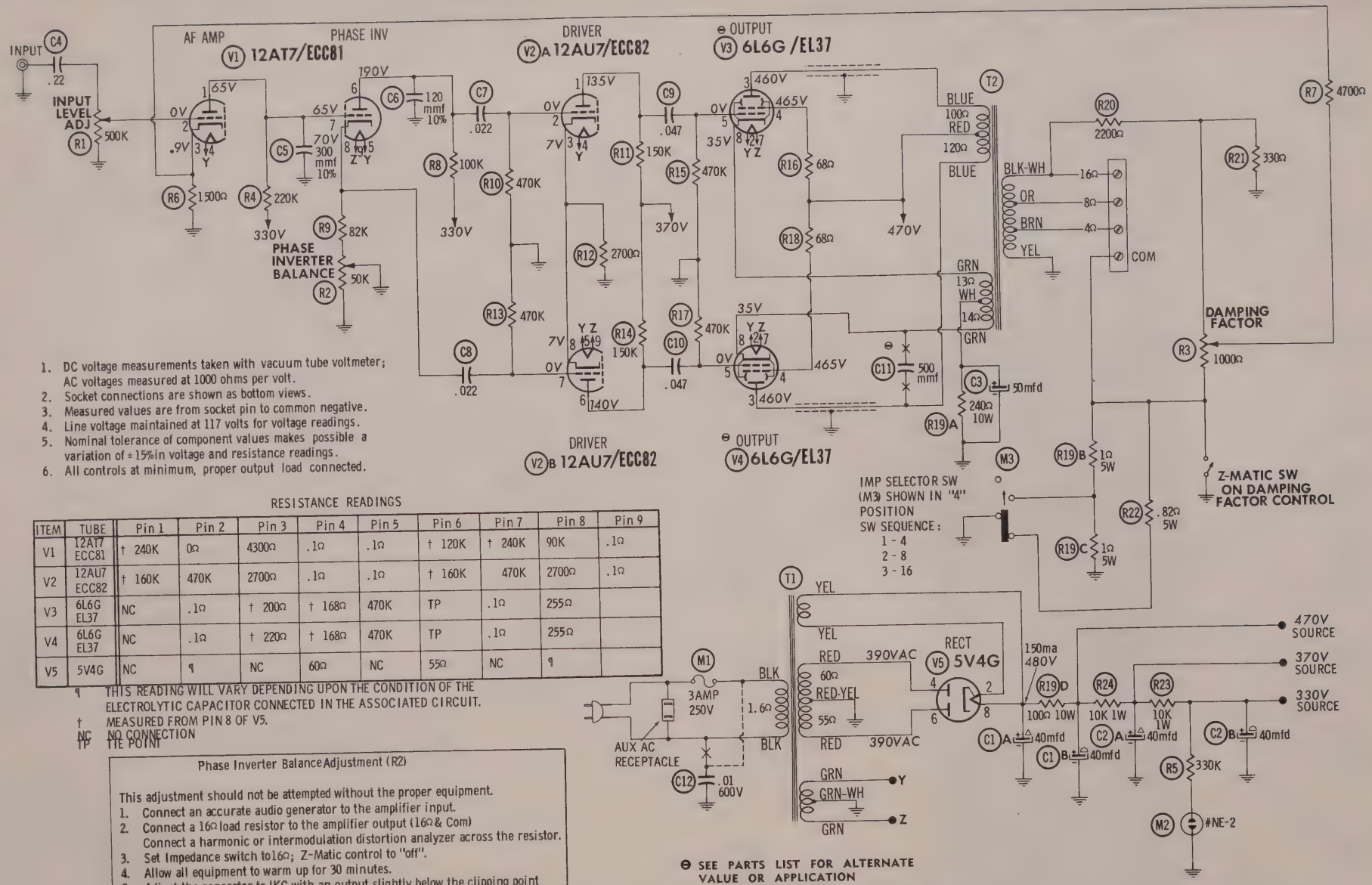
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AT7 ECC81	† 240K	0Ω	4300Ω	.1Ω	.1Ω	† 120K	† 240K	90K	.1Ω
V2	12AU7 ECC82	† 160K	470K	2700Ω	.1Ω	.1Ω	† 160K	470K	2700Ω	.1Ω
V3	6L6G EL37	NC	.1Ω	† 200Ω	† 168Ω	470K	TP	.1Ω	255Ω	
V4	6L6G EL37	NC	.1Ω	† 220Ω	† 168Ω	470K	TP	.1Ω	255Ω	
V5	5V4G	NC	¶	NC	60Ω	NC	55Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 8 OF V5.
NC NO CONNECTION
TP TIE POINT

Phase Inverter Balance Adjustment (R2)

This adjustment should not be attempted without the proper equipment.
1. Connect an accurate audio generator to the amplifier input.
2. Connect a 16Ω load resistor to the amplifier output (16Ω & Com) Connect a harmonic or intermodulation distortion analyzer across the resistor.
3. Set Impedance switch to 16Ω; Z-Matic control to "off".
4. Allow all equipment to warm up for 30 minutes.
5. Adjust the generator to 1KC with an output slightly below the clipping point (approx. 1db) of the amplifier. This output must be held constant.
6. Adjust R2 for minimum distortion as indicated on the analyzer.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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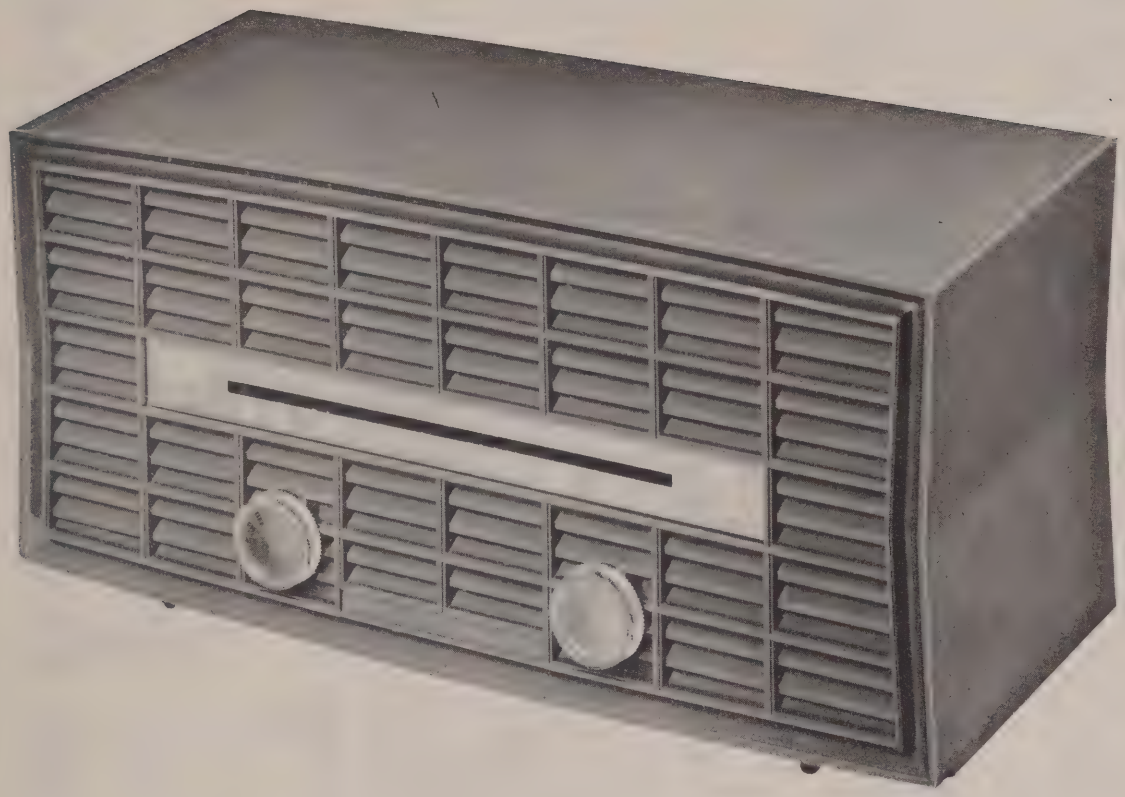
FISHER MODEL 100

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

GRANCO MODEL T-161

GRANCO MODEL T-161



GRANCO MODEL T-161

TRADE NAME	Granco Model T-161		
MANUFACTURER	Granco Products, Inc., 36-07 20th Ave., Long Island City 5, N. Y.		
TYPE SET	AC Operated FM Tuner		
TUBES	Six		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING	24 Watts, .35 Amp. @ 117 Volts AC
TUNING RANGE	FREQ. MOD. 88-108MC		

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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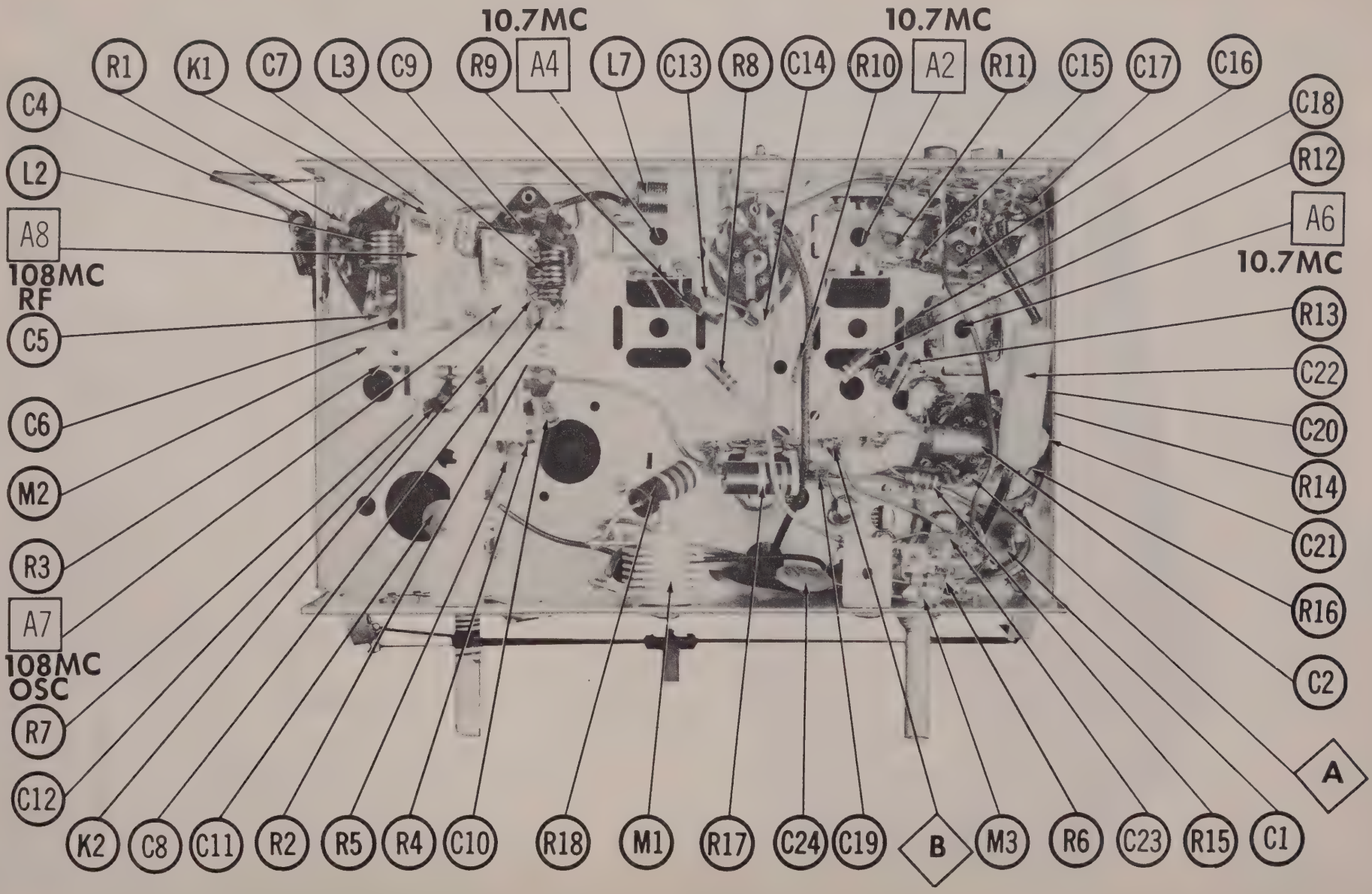


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BA6	
V2	Mixer-Osc.	12AT7	
V3	AFC	6AB4	
V4	1st IF Amplifier	6BA6	
V5	2nd IF Amplifier	6BA6	
V6	Ratio Detector	6AL5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA GRANCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150		AFH3-12-20	C0100	FP311.65	TMT-10	T-050	R2302 *
B	▲50	150				TC47	TD-30-150	MT-1530	
C	50	150							
C2	2	50		PRS50V2	BBR2-50	TT150X2	TD-2-50	MT-0502	TVA-1301

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA GRANCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	10			NPO-SI 10	D6-100	CTA6Q1C	ZT-541	5TCC-Q1	10%
C4	50			SI 50	D6-500	LT6Q5	UC-545	5GA-Q5	
C5	1000			EF-001	MFT-1000			503C-D1	
C6	1000			EF-001	MFT-1000			503C-D1	
C7	1500			BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C8	2000								10% N220
C9	5								
C10	220			BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C11	10000			BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C12	1500			BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C13	1500			BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C14	1500			BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C15	1500			BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C16	1500			BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C17	1500			BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C18	220			BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C19	1500			BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C20	1500			BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C21	1500			BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C22	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C23	4700			BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	①
C24	4700			BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	①

① Not used in some versions.

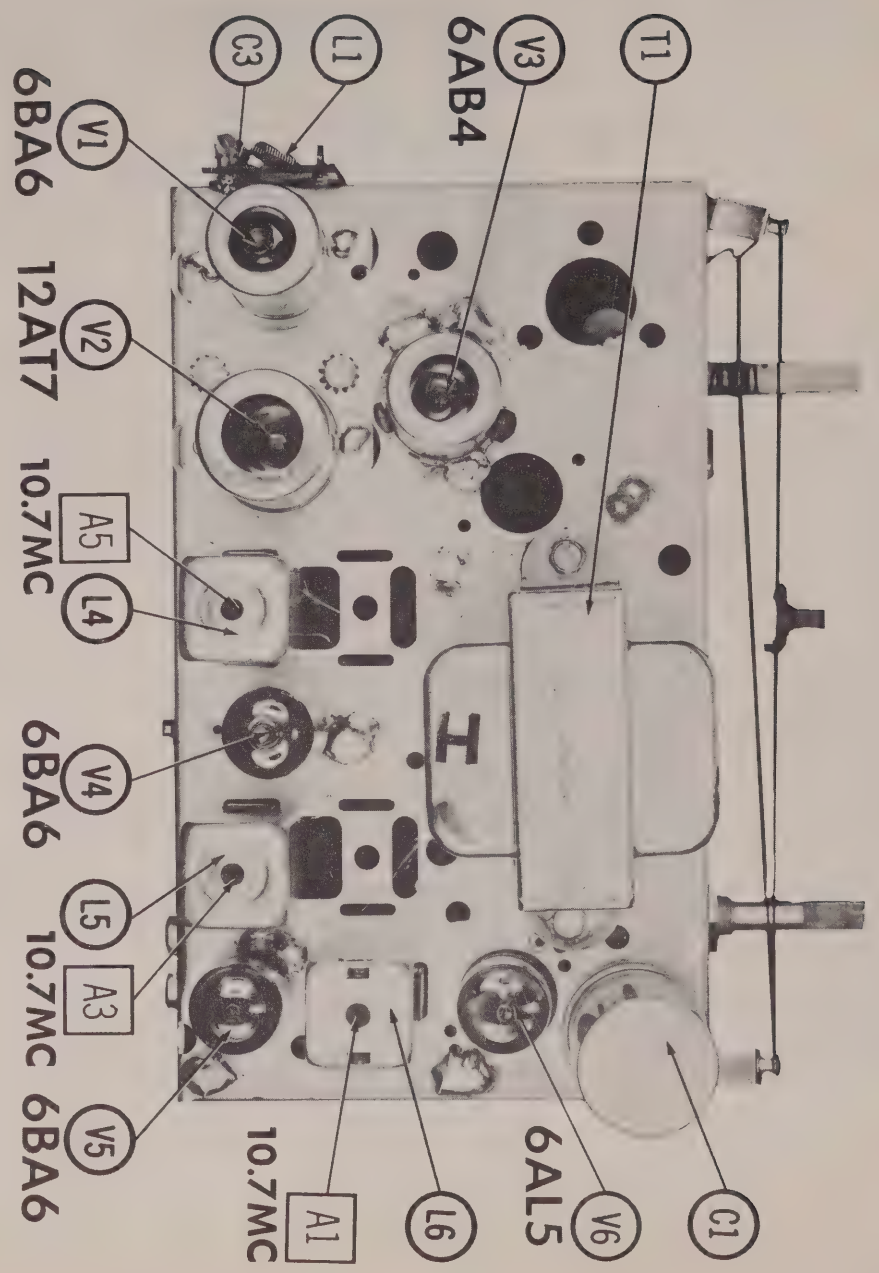
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	GRANCO PART No.	NOTES
R1	470K			
R2	100Ω			
R3	330Ω			
R4	33Ω			
R5	470K			
R6	10meg			
R7	2200Ω			Note 1
R8	330Ω			
R9	220K			
R10	330Ω			
R11	100K			
R12	330Ω			
R13	22K			
R14	10K			
R15	33K			
R16	10K			
R17	470Ω	2		
R18	470Ω	2		

Note 1. Some versions may use 22K in this application.

CHASSIS—TOP VIEW



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	200mmf	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	10. 7MC (Unmod.)	Point of non-interference	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4, A5	Adjust for maximum deflection.
2.	"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A6	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	200mmf	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	10. 7MC (450KC Swp)	Point of non-interference	Vert. Amp. to point Ⓐ. Low side to chassis.	A1, A2, A3, A4, A5	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
2.	"	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A6	Reconnect stabilizing capacitor C2. Adjust so that 10. 7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A1 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
3.	10mmf	High side to FM antenna terminal. Low side to chassis.	108MC (Unmod.)	108MC	DC probe to point Ⓐ. Common to chassis.	A7, A8	Adjust for maximum deflection.
4.	"	"	88MC	88MC	"	L3, L2	Adjust for maximum deflection by compressing or expanding coil turns. Repeat steps 3 and 4.

FIG. 1

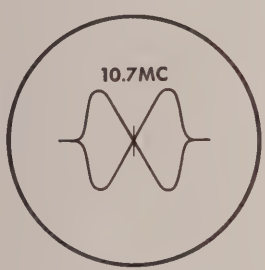


FIG. 2

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		GRANCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Ant. Coil						
L2	RF Coil						
L3	Osc. Coil		16-3487	FM-254	1463		
L4	1st IF Trans.		16-3487	FM-254	1463		
L5	2nd IF Trans		17-3498	FM-255	1465		
L6	Ratio Detector		19-1002	BC-563	4606		2.1 Microhenries
L7	Fil. Choke						

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	GRANCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ② .35A	130V ② .050A Tap ② 6.3V ② 1.7A		545-7	P9102 ①	P-3045 ①		PA8421 ①	26R38 ①	R-30X ①

① Drill new mounting hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	GRANCO PART No.	REPLACEMENT DATA
K1	Mixer Grid Coupling	1200mmf, 4.7meg		①
K2	Mixer-Osc. Coupling	80mmf, 10K		②

① Some versions may use a 1500mmf capacitor with a 470K resistor from pin 7 V2 to ground.
② Some versions may use an 80mmf capacitor with a 10K resistor from pin 2 V2 to ground.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	GRANCO PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.047A		1234AH	T065 SD-92 ①	65 K200 ①	① Silicon Type

MISCELLANEOUS

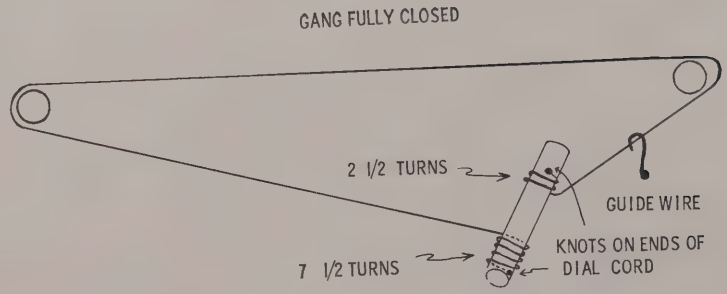
ITEM No.	PART NAME	GRANCO PART No.	NOTES
M2 M3	Tuner Switch	19-17	FM Selector, 3 Position, Rotary Wafer Type

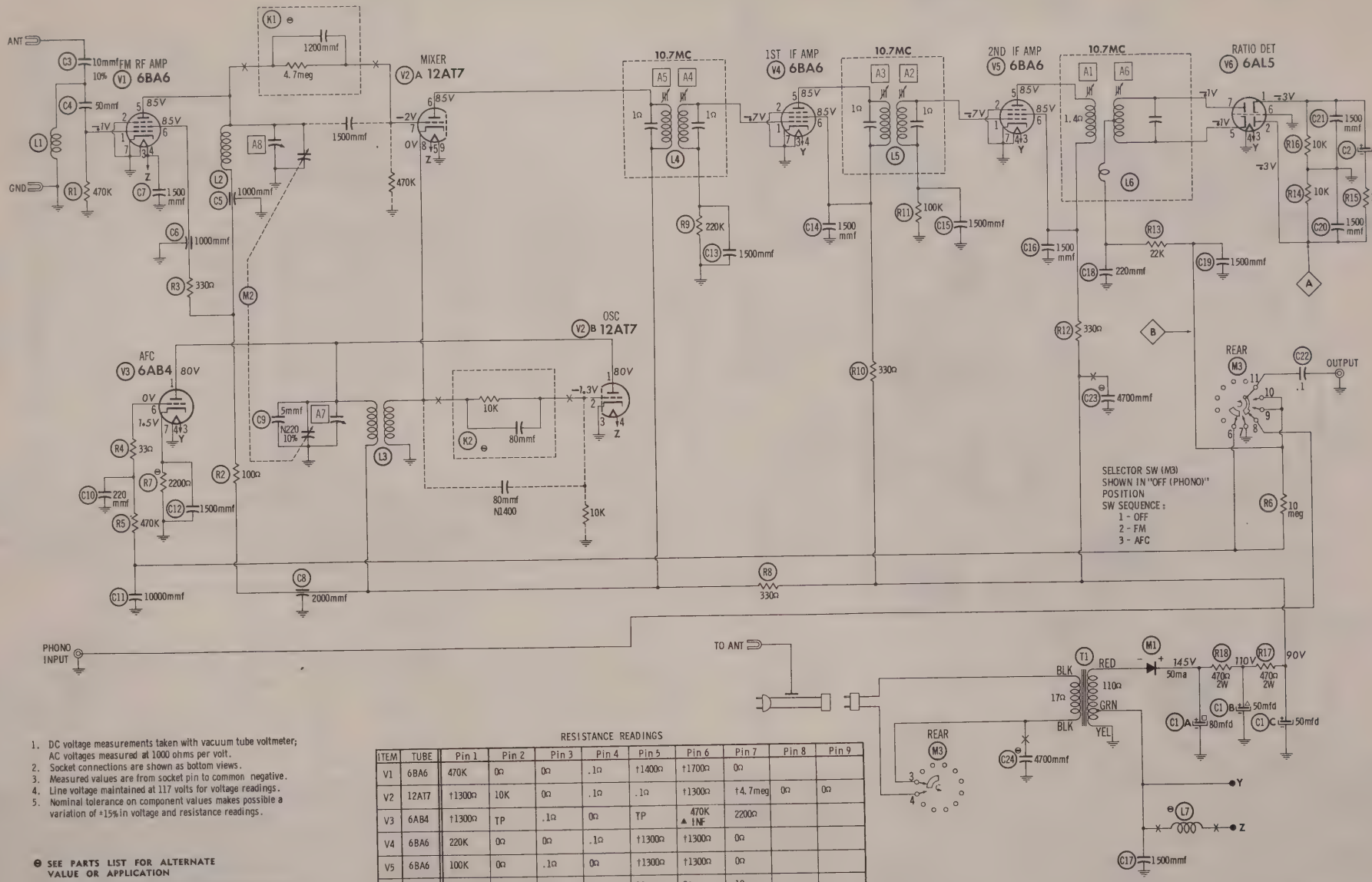
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

DIAL CORD STRINGING





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BA6	470K	0Ω	0Ω	.1Ω	†1400Ω	†1700Ω	0Ω		
V2	12AT7	†1300Ω	10K	0Ω	.1Ω	.1Ω	†1300Ω	†4.7meg	0Ω	0Ω
V3	6AB4	†1300Ω	TP	.1Ω	0Ω	TP	470K ▲ INF	2200Ω		
V4	6BA6	220K	0Ω	0Ω	.1Ω	†1300Ω	†1300Ω	0Ω		
V5	6BA6	100K	0Ω	.1Ω	0Ω	†1300Ω	†1300Ω	0Ω		
V6	6AL5	10K	10K	.1Ω	0Ω	10meg	0Ω	10meg		

† MEASURED FROM OUTPUT OF M1.
TP TIE POINT
▲ MEASURED IN "FM-AFC" POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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GRANCO MODEL T-161

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

GROMMES MODEL 20PG8

GROMMES MODEL 20PG8

GROMMES MODEL 20PG8

TRADE NAME	Grommes Model 20PG8
MANUFACTURER	Precision Electronics, Inc., 9101 King Ave., Franklin Park, Illinois
TYPE SET	AC Operated 6 Channel Audio Amplifier
TUBES	Seven
POWER SUPPLY	110-120 Volts AC - 60 Cycles RATING 72 Watts, .67 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H801

SET 429 FOLDER 7

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Pre Amplifier	7025	Note 1
V2	AF Amplifier	12AX7	
V3	AF Amp. -Phase Inv.	12AX7	
V4	Output	6BQ5/ EL84	

ITEM No.	USE	TYPE	NOTES
V5	Output	6BQ5/ EL84	
V6	Voltage Regulator	0B2	
V7	Rectifier	6CA4/ EZ81	

Note 1. Some versions may use ECC83/ 12AX7 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA GROMMES PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▬ 40	450		AFH3-50-05	C0372	FP396.1	TMT-37	T-160	TVL-3842
B	■ 20	450							
C	▲ 20	450							
C2A	■ 10	350		AFH3-189-40	B0370	FP387.1	TMT-88	T-450	R2518 *
B	▲ 10	250			BBR100-15		TD-100-15	MTH-1510	
C	100	15							
C3	50	50		PRS50V50	BR505	TC39	TD-50-50	MT-0550	TVA-1308

* Not normally in distributors stock. Available through distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA GROMMES PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	100			N750-SI100	TCN-100	CTA6T1U	CN7-310	5TCU-T1	N250 10%
C5	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C6	10000			BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C7	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C8	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C9	2000						JL-220	5GA-D2S 10% *	10%
C10	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C11	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C12	250				MD-251	L10T25		5GA-T25S 10% *	10%
C13	1000						JL-210	5GA-D1S 10% *	10%
C14	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C15	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA GROMMES PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	MLC-500K2T	ABT-160 †		Q18-133XX	UDT-283	Volume, Tap @ 100K & 200K
B	Shaft			AK-9		PQ	Not Req.	
R2A	1meg	½	MTC-1M	AB-69 †	A47-1meg-S	Q11-137	U54	Treble
B	Shaft			AK-9	RS-2	PQ	Not Req.	
R3A	1meg	½	MTC-1M	AB-69 †	A47-1meg-S	Q11-137	U54	Bass
B	Shaft			AK-9	RS-2	PQ	Not Req.	

† Use an extra mounting nut behind mounting surface.

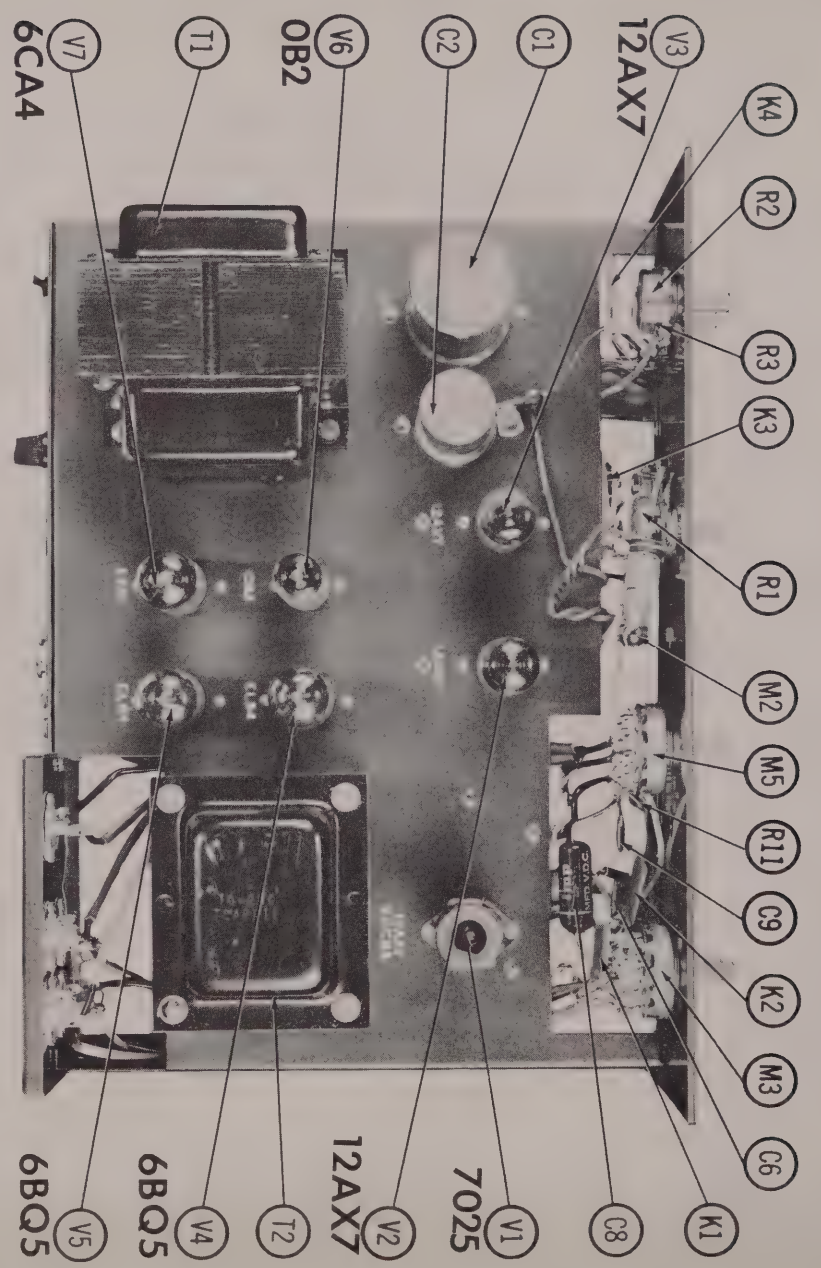
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	GROMMES PART No.	NOTES
R4	47K			
R5	100K	1		
R6	1000Ω			
R7	3.3meg			
R8	100K			
R9	47K			
R10	4.7meg			

ITEM No.	RATING OHMS	RATING WATT	GROMMES PART No.	NOTES
R11	47K			
R12	100K			
R13	100K			
R14	100K			
R15	470Ω			
R16	100K			
R17	22K			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	GROMMES PART No.	NOTES
R18	100K			
R19	220K			
R20	10K			
R21	100Ω			
R22	1000Ω			
R23	47K			
R24	220K			

ITEM No.	RATING OHMS	RATING WATT	GROMMES PART No.	NOTES
R25	1000Ω			
R26	220K 5%			
R27	100K	1		
R28	150Ω	7		
R29	270K 5%			
R30	22K	2		
R31	150Ω	7		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA GROMMES PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @.67A	680 VCT @.080A	6.3 VCT @3.5A	TP-20	P9311①	P-2952①		PM8409①	24R04①	R-11B①

① Use original shields.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA GROMMES PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	9000Ω CT	16Ω Taps@ 8Ω 4Ω	TO-20C		A-3132①		A-3311①	22S93 ①	S-31A①	① Use original shields.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	GROMMES PART No.	REPLACEMENT DATA
K1	Tone Compensation	330mmf, 800mmf, 1500mmf, 100K	RO-193	
K2	Tone Comp nsation	1000mmf, 2000mmf, 2000 mmf, 4000mmf, 1meg, 3.3meg.	TO-192	
K3	Tone Compensation	51mmf, 10000mmf, 10000mmf, 22K, 47K, 470K	LC-195	
K4	Tone Compensation	3000mmf, 470mmf, 3000mmf, 68K, 68K, 68K, 10K	TC-190	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA GROMMES PART No. FUSE	GROMMES PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	2A 250V			312002. (3AG 2A 250V)	342001	MDX2	HKP

MISCELLANEOUS

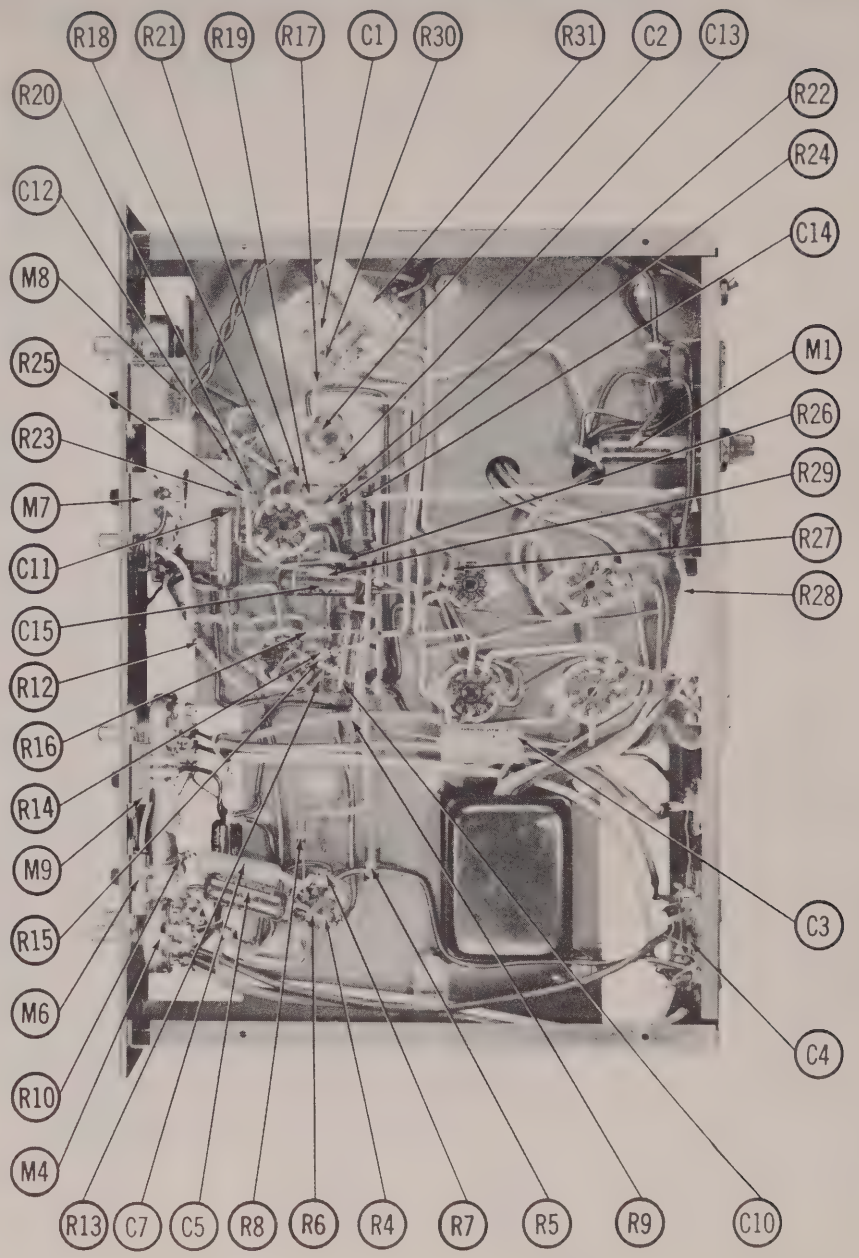
ITEM No.	PART NAME	GROMMES PART No.	NOTES
M2	Lamp		#51
M3	Switch		Roll Off Selector, 4 Position, (Rotary Wafer Type)
M4	Switch		Turnover Selector, 4 Position, (Rotary Wafer Type)
M5	Switch		Input Selector, 4 Position, (Rotary Wafer Type)
M6	Switch		Rumble Filter (SPDT Slide Type)
M7	Switch		Loudness, (DPDT Slide Type)
M8	Switch		Power Off-On, (SPST Slide Type)
M9	Switch		Scratch Filter (SPDT Slide Type)

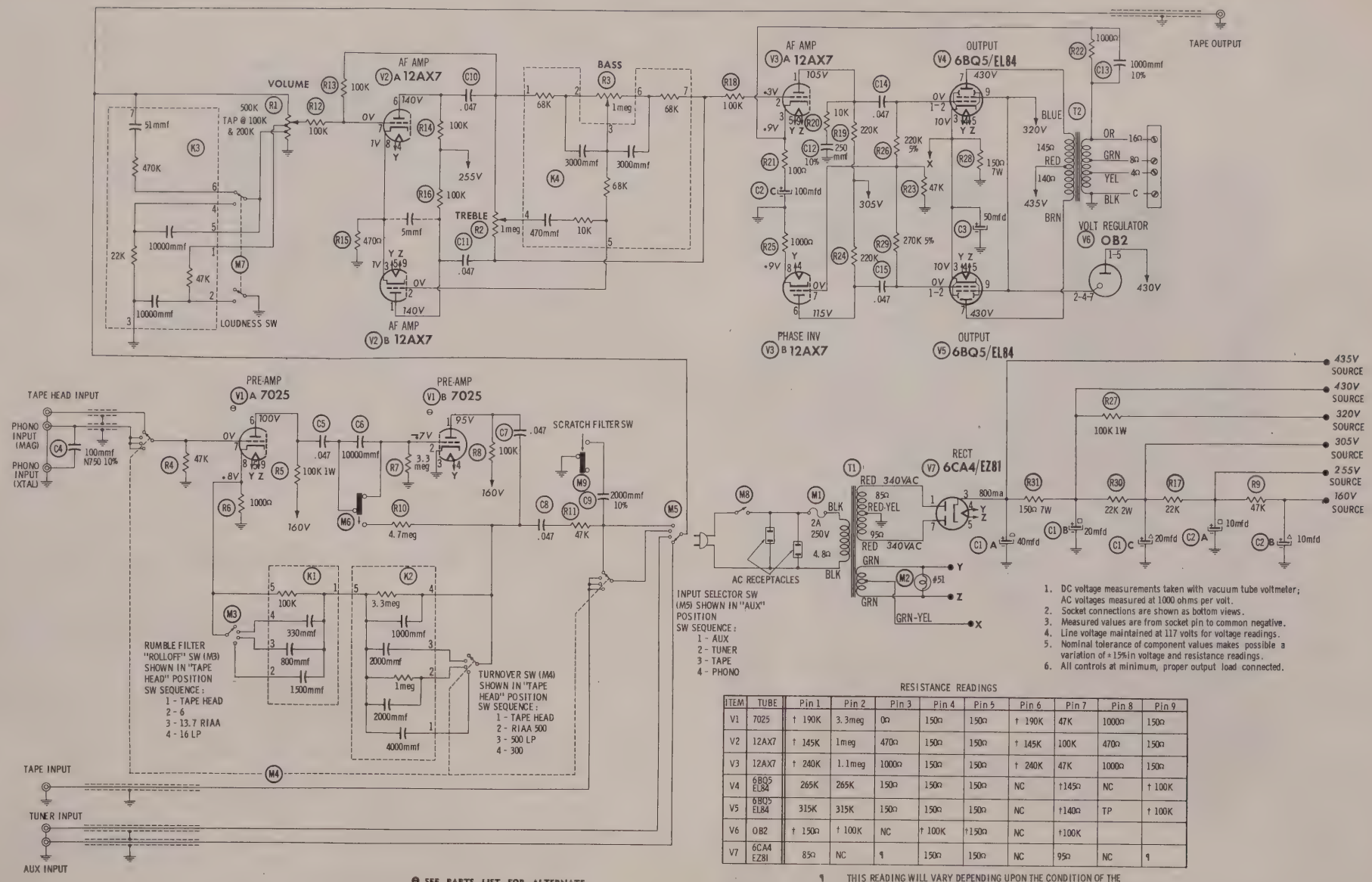
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7025	† 190K	3.3meg	0Ω	150Ω	150Ω	† 190K	47K	1000Ω	150Ω
V2	12AX7	† 145K	1meg	470Ω	150Ω	150Ω	† 145K	100K	470Ω	150Ω
V3	12AX7	† 240K	1.1meg	1000Ω	150Ω	150Ω	† 240K	47K	1000Ω	150Ω
V4	6BQ5 EL84	265K	265K	150Ω	150Ω	150Ω	NC	†145Ω	NC	† 100K
V5	6BQ5 EL84	315K	315K	150Ω	150Ω	150Ω	NC	†140Ω	TP	† 100K
V6	OB2	† 150Ω	† 100K	NC	† 100K	†150Ω	NC	†100K		
V7	6CA4 EZ81	85Ω	NC	¶	150Ω	150Ω	NC	95Ω	NC	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 3 OF V7.
NC NO CONNECTION
TP TIE POINT

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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GROMMES MODEL 20PG8

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

LEAK MODEL TL/12 Plus

LEAK MODEL
TL/12 Plus

LEAK MODEL
TL/12 Plus

TRADE NAME	Leak Model TL/12 Plus		
IMPORTER	British Industries Corp., 80 Shore Road, Port Washington, N. Y.		
TYPE SET	AC Operated Audio Amplifier		
TUBES	Five		
POWER SUPPLY	105/110/117 Volts AC, 60 Cycles	RATING	72 Watts, .70 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H746

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp	EF86/ Z729/ 6267	①
V2	AF Amp – Phase Inverter	ECC81/ B309/ 12AT7	①

ITEM No.	USE	TYPE	NOTES
V3	Output	EL84/ N709/ 6BQ5	①
V4	Output	EL84/ N709/ 6BQ5	①
V5	Rectifier	GZ34/ 5AR4/ 5V4	①

① Domestic type listed may not be directly interchangeable in some instances.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA LEAK PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	450						Q-066	R2718 *
B	100	450						MT-4540	
C2A	8	450		PRS450V168	BBRD16845		TDLD-25	FMD-308	TVA-2725
B	16	450							
C3	1	350		PRS450V1	BR145			MMT-4501	R1260 *
C4	50	12		SRE12V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C5	50	25		PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C6	50	25		PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA LEAK PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C7	15			1468-000015		5W5Q15		1FM-415	
C8	10000			SI10000	D6-103	LT6S1	DC511	5HK-S1	
C9	.1	350		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C10	.25	350		P488N-25		CUB4P25	GEM-4025	4TM-P25	
C11	.02	175		P288N-02	DD-203	CUB2S2	GEM-412	2TM-S2	
C12	.25	350		P488N-25		CUB4P25	GEM-4025	4TM-P25	
C13	200			1468-0002		5W5T2	MC237	1FM-32	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	LEAK PART No.	NOTES
R1	1meg			
R2	22K			
R3	82K			
R4	1meg			
R5	2200Ω			
R6	100Ω			
R7	100K	1		
R8	3.3meg			
R9	91K	1		
R10	1000Ω			
R11	22K	1		

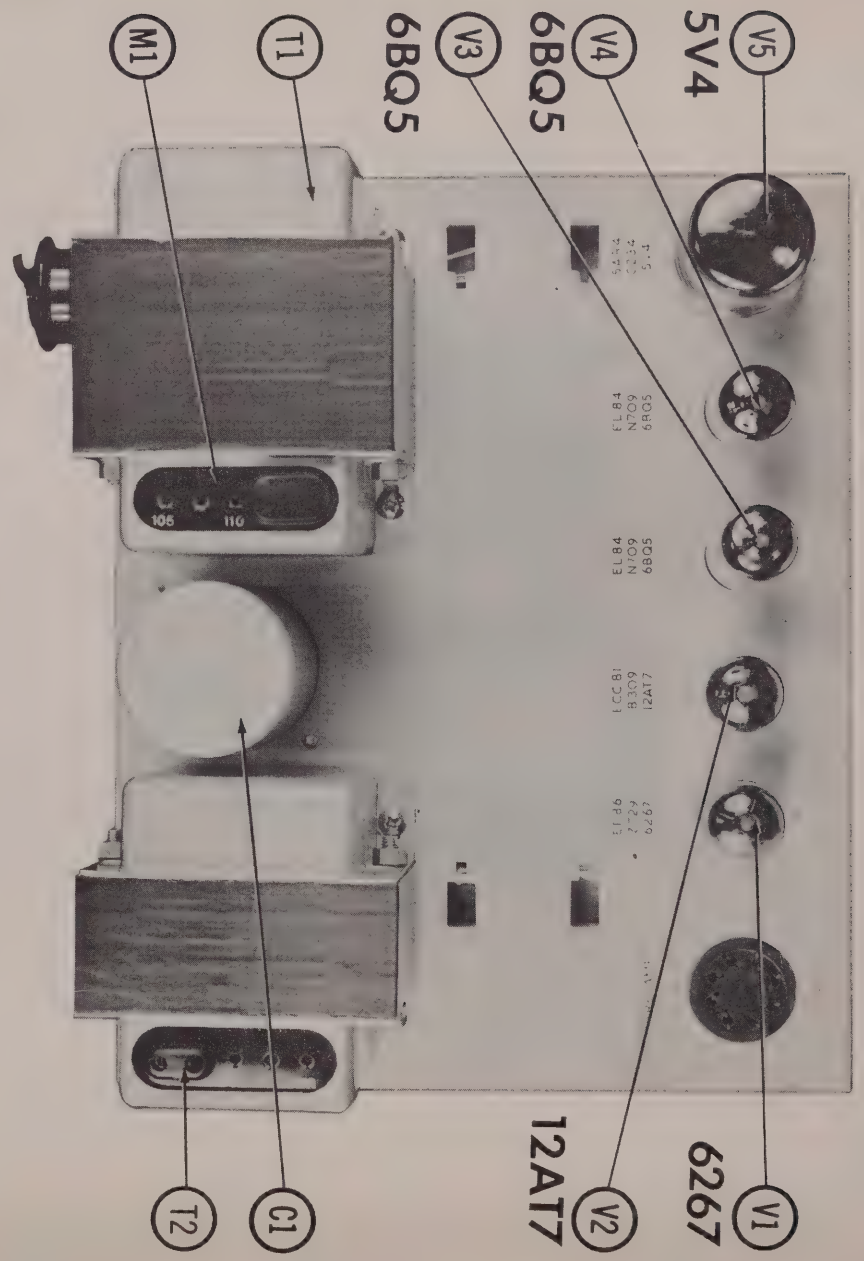
ITEM No.	RATING OHMS	RATING WATT	LEAK PART No.	NOTES
R12	3.3meg			
R13	100K	1		
R14	10K			
R15	1meg			
R16	270Ω	1		
R17	10K			
R18	1meg			
R19	270Ω	1		
R20	10K			
R21	12K			
R22	100Ω 5%	5(WW)		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA LEAK PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .7A Taps @ 110V, 105V'	600VCT @ .100A	5V @ 1.6A	3973				P-8177 ①		
	SEC. 3	SEC. 4	SEC. 5							
	6.3VCT @ 2A									

① Drill new mounting holes. Primary not tapped.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	LEAK PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	8500 Ω CT with screen Taps @1400 Ω from CT	16Ω Taps@ 8Ω, 4Ω	3921	H4103 ①					S-142A ①	① Drill new mounting holes

FUSES

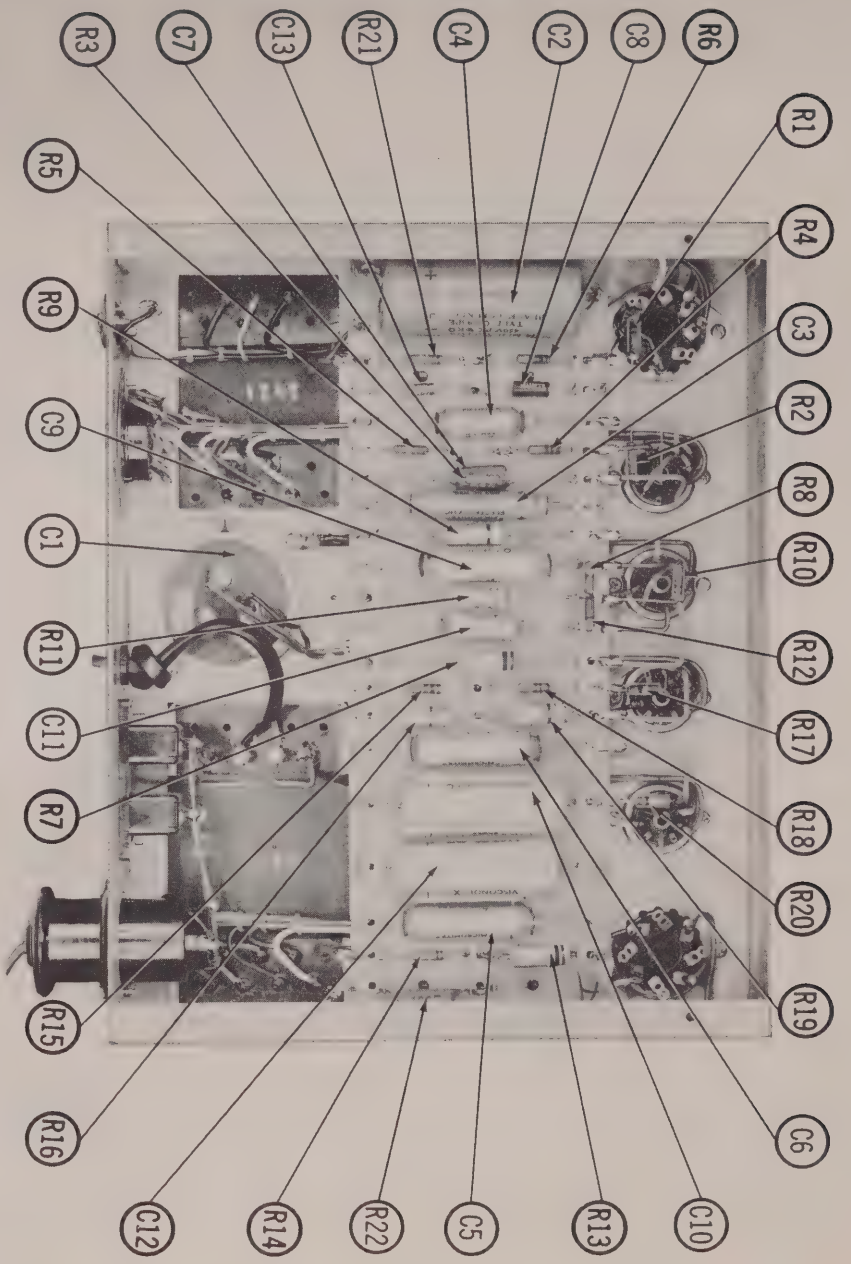
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			LEAK PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1		3A 125V						

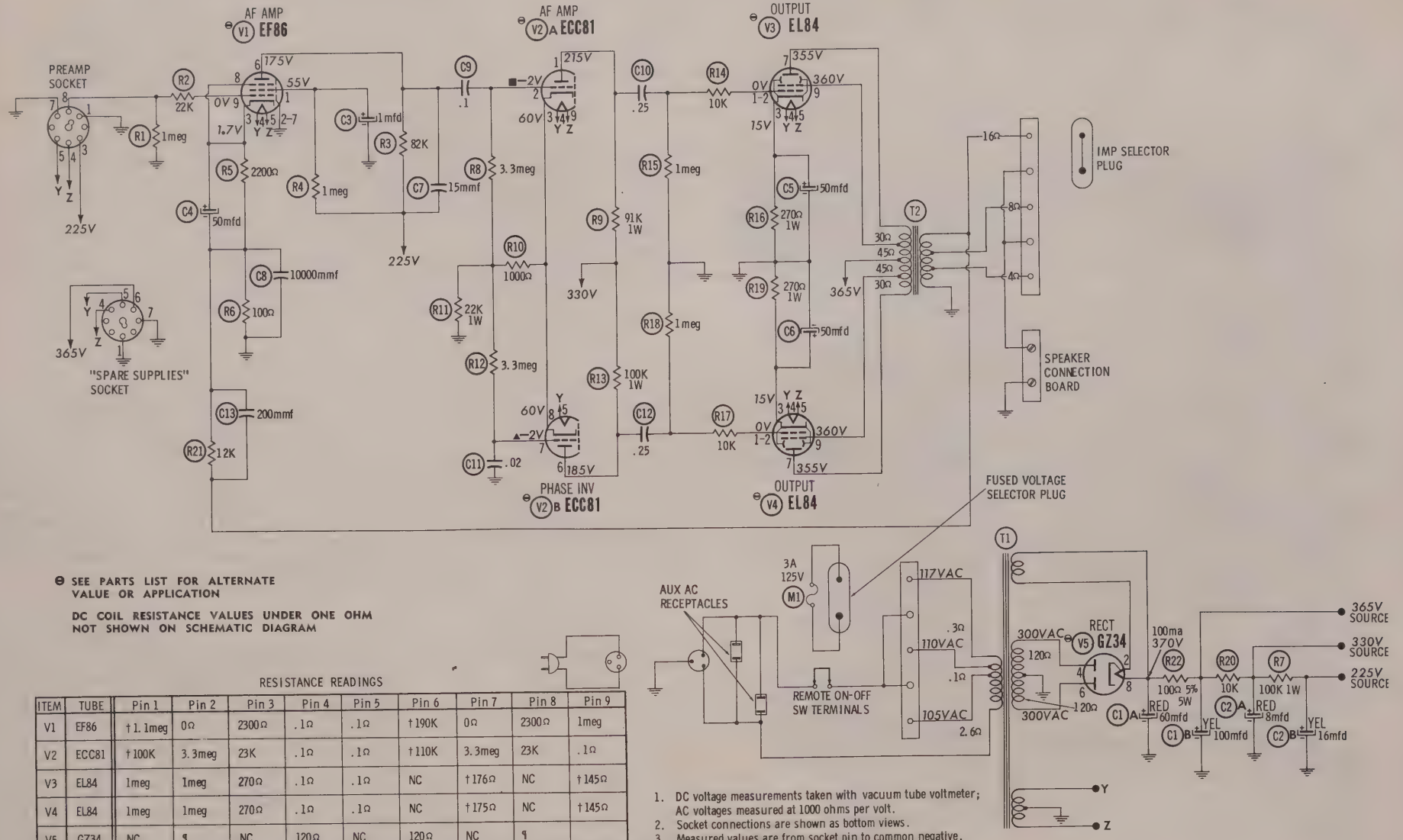
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	EF86	†1.1meg	0Ω	2300Ω	.1Ω	.1Ω	†190K	0Ω	2300Ω	1meg
V2	ECC81	†100K	3.3meg	23K	.1Ω	.1Ω	†110K	3.3meg	23K	.1Ω
V3	EL84	1meg	1meg	270Ω	.1Ω	.1Ω	NC	†176Ω	NC	†145Ω
V4	EL84	1meg	1meg	270Ω	.1Ω	.1Ω	NC	†175Ω	NC	†145Ω
V5	GZ34	NC	¶	NC	120Ω	NC	120Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 8 OF V5. ▲ MEASURED FROM PIN 8 OF V2.
■ MEASURED FROM PIN 3 OF V2. NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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LEAK MODEL TL/12 Plus

PHOTOFACT* Folder

EIA

OLYMPIC MODEL 455

OLYMPIC MODEL 455

OLYMPIC MODEL 455

TRADE NAME	Olympic Model 455
MANUFACTURER	Olympic Radio & Tel. Corp., 34-01 38th Ave., Long Island City 1, N. Y.
TYPE SET	AC-DC Operated AM Receiver
TUBES	Four
POWER SUPPLY	110 - 120 Volts AC-DC
RATING	26 Watts, .275 Amp. @117 Volts AC
TUNING RANGE—BROADCAST	535 - 1650KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

Suggested alignment tools: A1, A2.....General Cement #5097, 8727
Walsco #2515
A3, A4.....General Cement #5004, 5008, 5009
Walsco #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	Highside to antenna Stator lug of tuning gang. Low side to B-	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.	"	"	1650KC	"	"	A3	"
3.		Loop	1400KC	Tune for 1400KC signal	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat Steps 2 & 3.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

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SET 429 FOLDER 9

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12AU6	
V2	Det. -AF Amp.	12AV6	
V3	Output	50C5	
V4	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	150	150-141	PRS150V503	BBRT53215		TDLT-6	FMT-315	R2395 *
B	30	150		010					
C	10	150							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	47		156-107	SI47	D6-470	LT6Q47	UC-5447	5GA-Q47	
C3	6.8		168-102	NPO-SI6.8	TCZ-6R8	CTA6V68C	ZT-5568	5TCCB-V68	Note 1
C4	6.8		168-102	NPO-SI6.8	TCZ-6R8	CTA6V68C	ZT-5568	5TCCB-V68	
C5	10000		158-102	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C6	.05	400	152-111	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C7	.05	400	152-111	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	120-117	B-76	A47-2meg-Z	Q13-139	U55	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	76-1	76-1	US-26	

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

RESISTORS

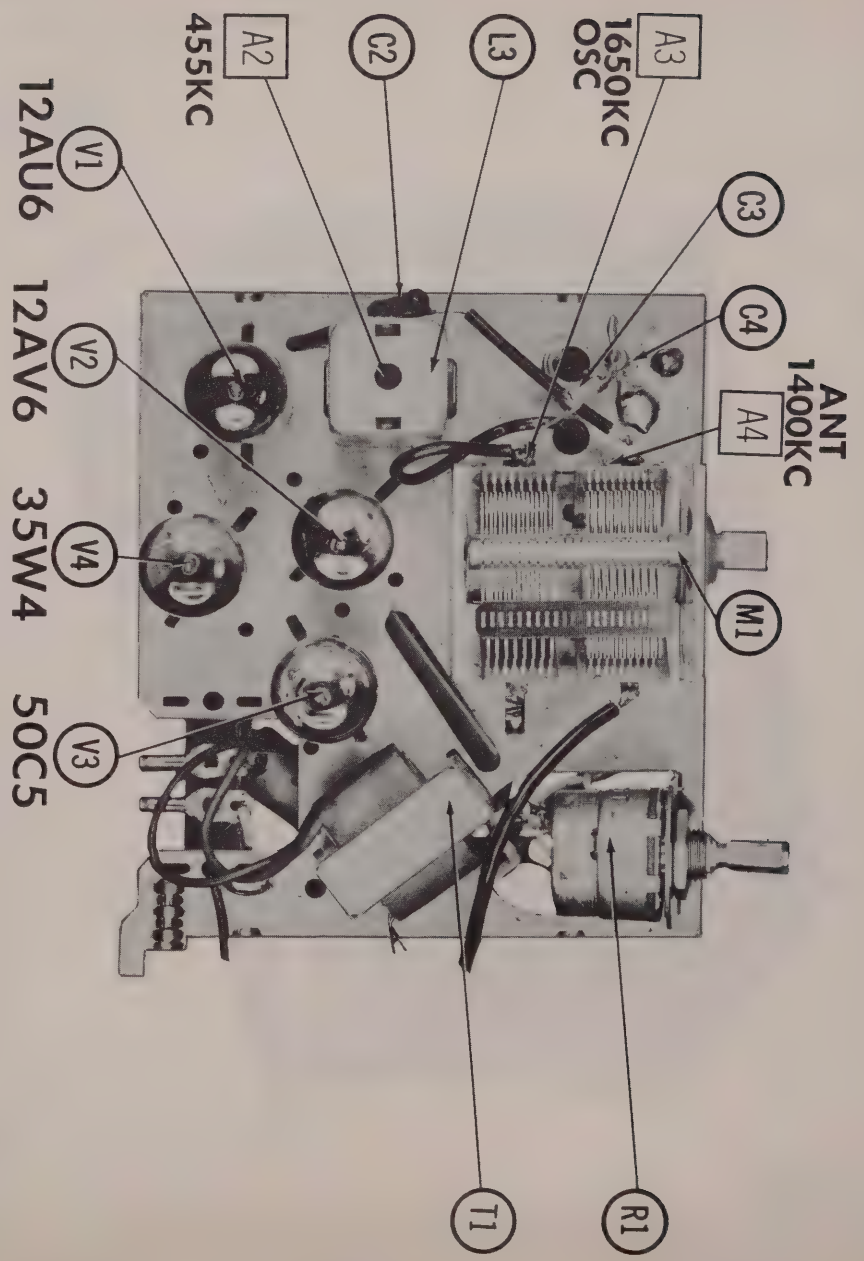
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	OLYMPIC PART No.	NOTES
R2	2.2meg		180-107	
R3	150Ω		180-111	
R4	2200Ω	1	180-101	
R5	47Ω	1	180-185	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA OLYMPIC PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Ant.	225-147					
L2	Osc. Coil	136-139					
L3	IF Trans.	130-106	16-6764				

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2200Ω	3-4Ω	138-130	Z1101 ①	A-3025 ①	ZU-605 ①	A3332 ①	24S53 ①	S-12X ①	① Rotate 90° and use original channel frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	175-137	4A05	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	OLYMPIC PART No.	REPLACEMENT DATA	
K1	Audio Coupling Unit	5000mmf, 220mmf 250mmf, 5000mmf 470K, 470K, 6.8meg	166-111	Aerovox Centralab Cornell-Dubilier Sprague	PA-113-2 PC-151 116TM2 DT-2

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M1	Tuning Cap.	160-129	2 Section, Ant. 25-248mmf, Osc. 20-104mmf

CABINETS & CABINET PARTS

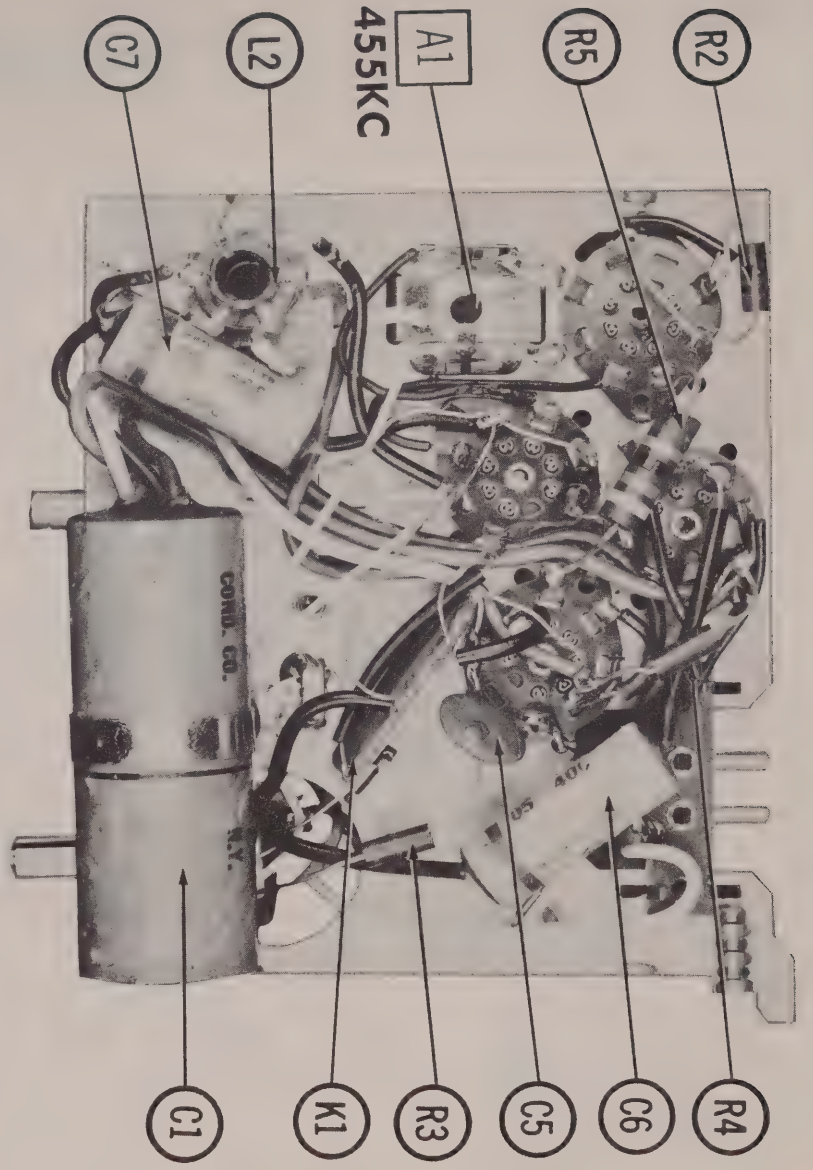
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

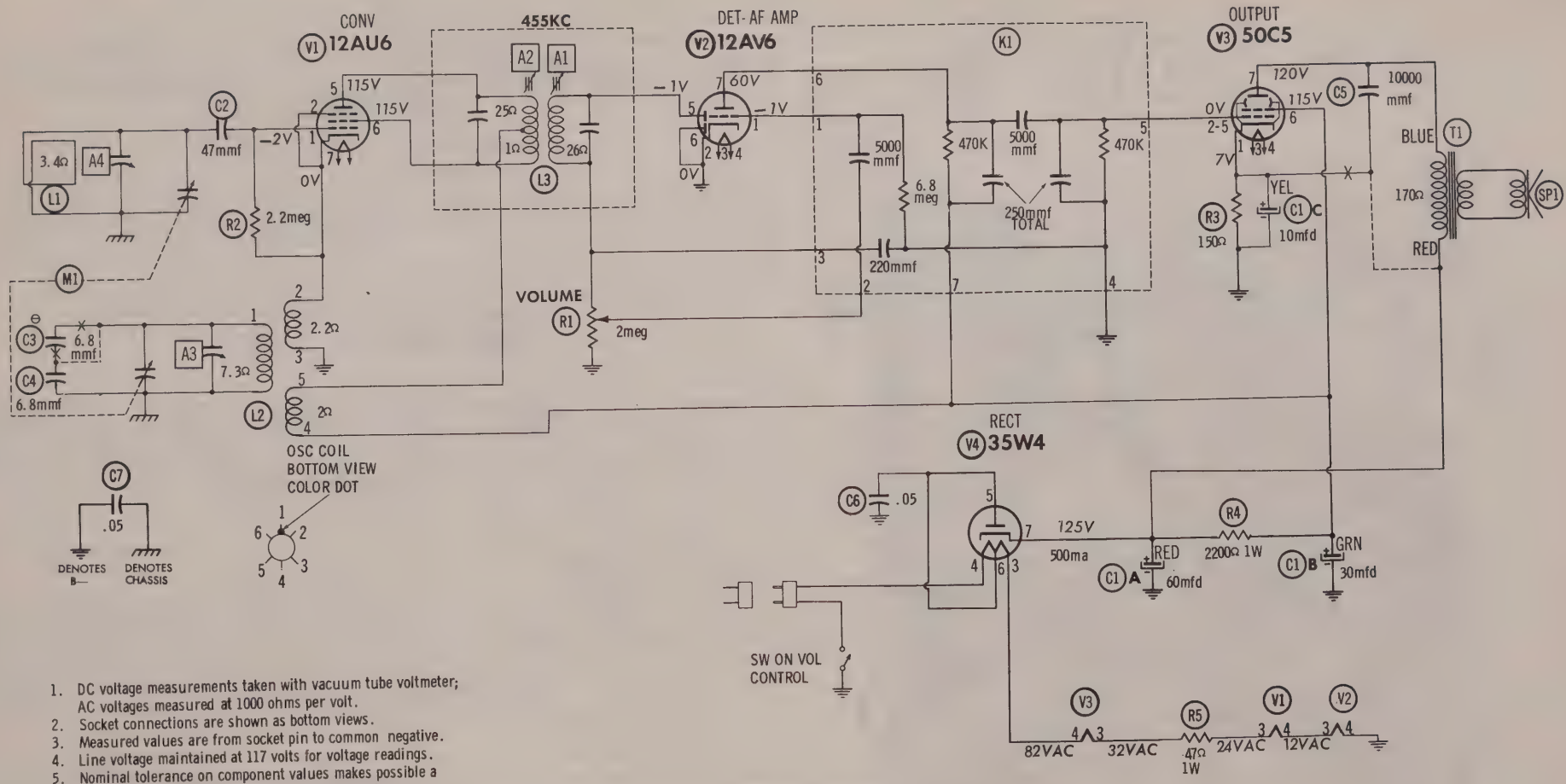
NAME	PART NO.	DESCRIPTION
Knob	220-153	Tuning
Knob	220-154	Off-On-Volume
Cabinet	210-150	Includes Dial And Nameplate

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AU6	2.2meg	2Ω	24Ω	12Ω	†2200Ω	†2200Ω	2Ω
V2	12AV6	6.8meg	0Ω	12Ω	0Ω	2meg	0Ω	† 470K
V3	50C5	150Ω	470K	70Ω	120Ω	470K	†2200Ω	†170Ω
V4	35W4	NC	NC	120Ω	155Ω	155Ω	145Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 7 OF V4.

NC NO CONNECTION.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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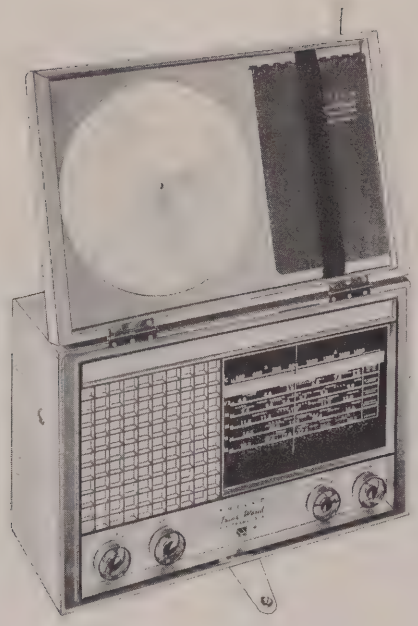
OLYMPIC MODEL 455

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PHILCO MODEL T-9 (Codes 124, 126)

PHILCO MODEL
T-9 (Codes 124, 126)

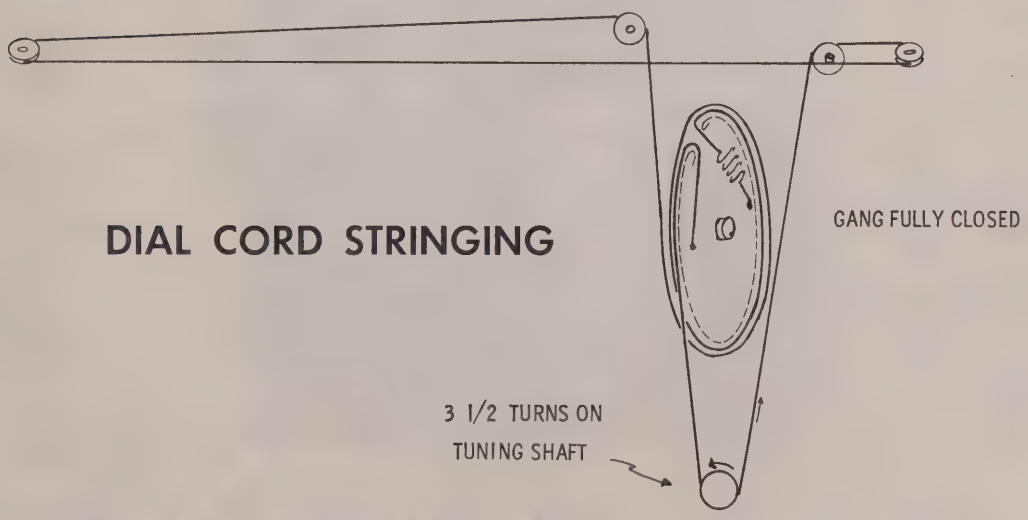


TRADE NAME	Philco Model T-9 Codes 124, 126			
MANUFACTURER	Philco Corp., Tioga & "C" Streets, Philadelphia, Pa.			
TYPE SET	Battery Operated 7 Band Transistorized Portable Receiver			
POWER SUPPLY	M1 6 Volts DC M2 1.5 Volts DC M3 1.5 Volts DC	RATING	M1 6 Volts DC @ 16MA (No Signal, Min. Volume) M2 1.5 Volts DC @ .2MA M3 1.5 Volts DC @ .1MA	

TUNING RANGES

Broadcast	540-1620KC	31 Meter Spread Band	9.4-9.9MC
Short Wave I	2-4MC	25 Meter Spread Band	11.4-12.0MC
Short Wave II	4-8MC	19 Meter Spread Band	14.8-15.6MC
		16 Meter Spread Band	17.2-18.2MC

DIAL CORD STRINGING



PHILCO MODEL
T-9 (Codes 124, 126)

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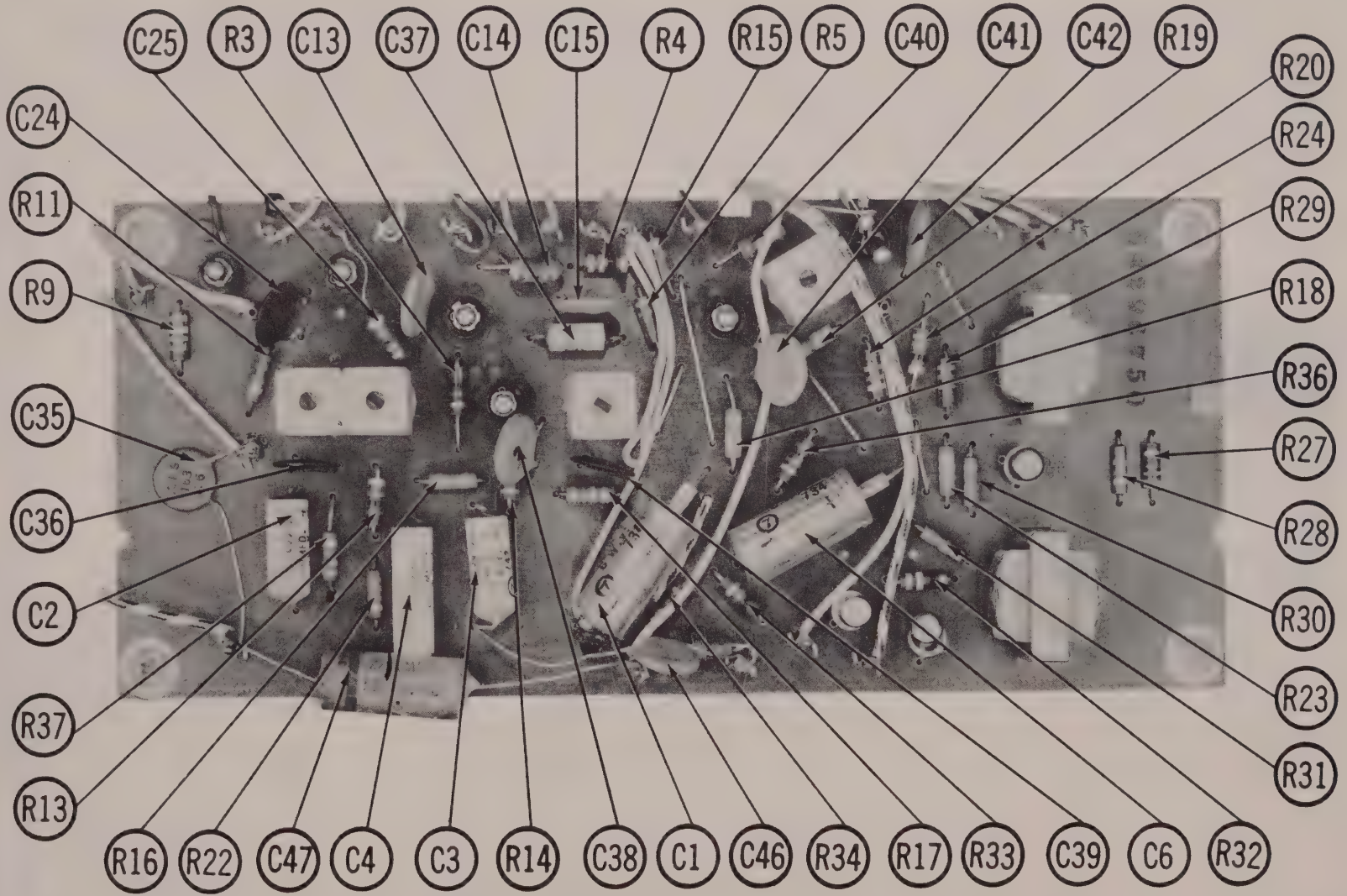
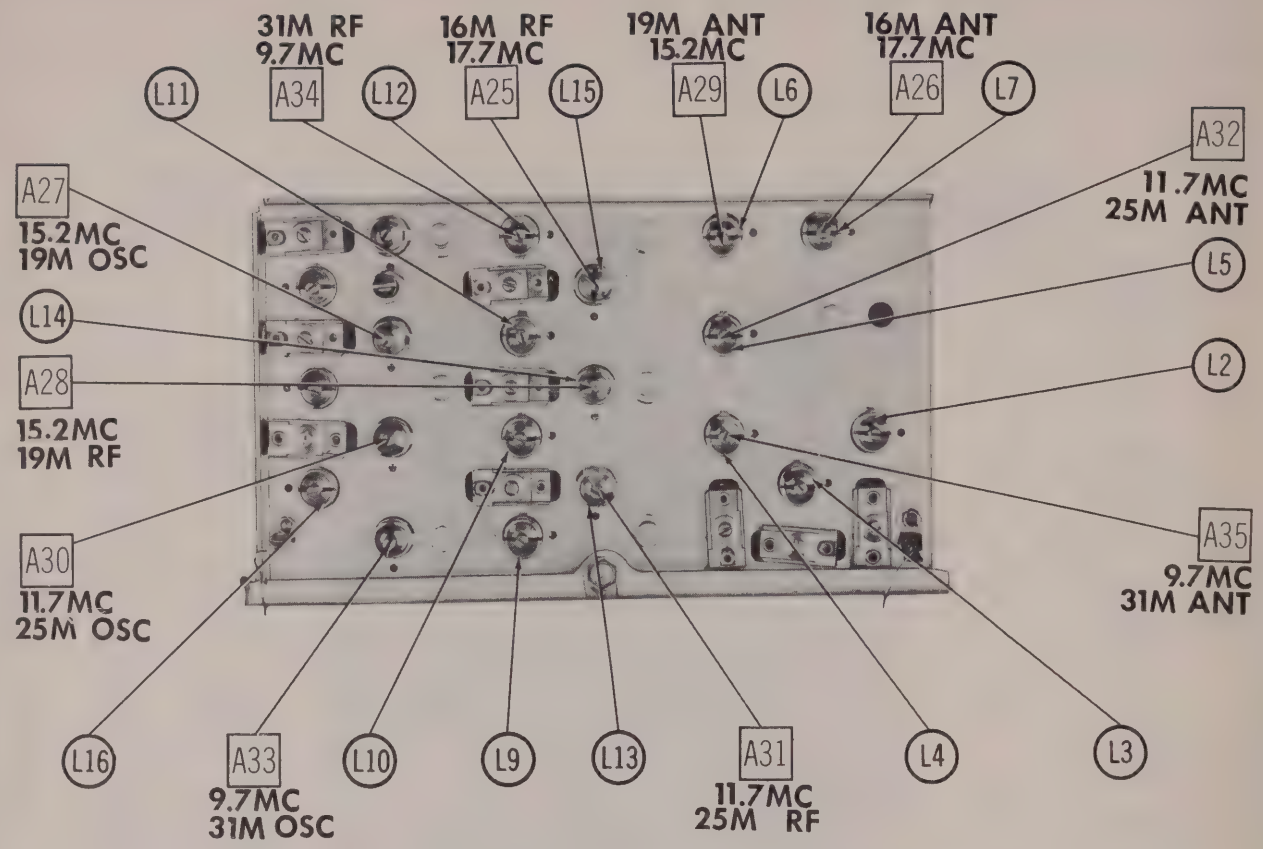
SET 429 FOLDER 10



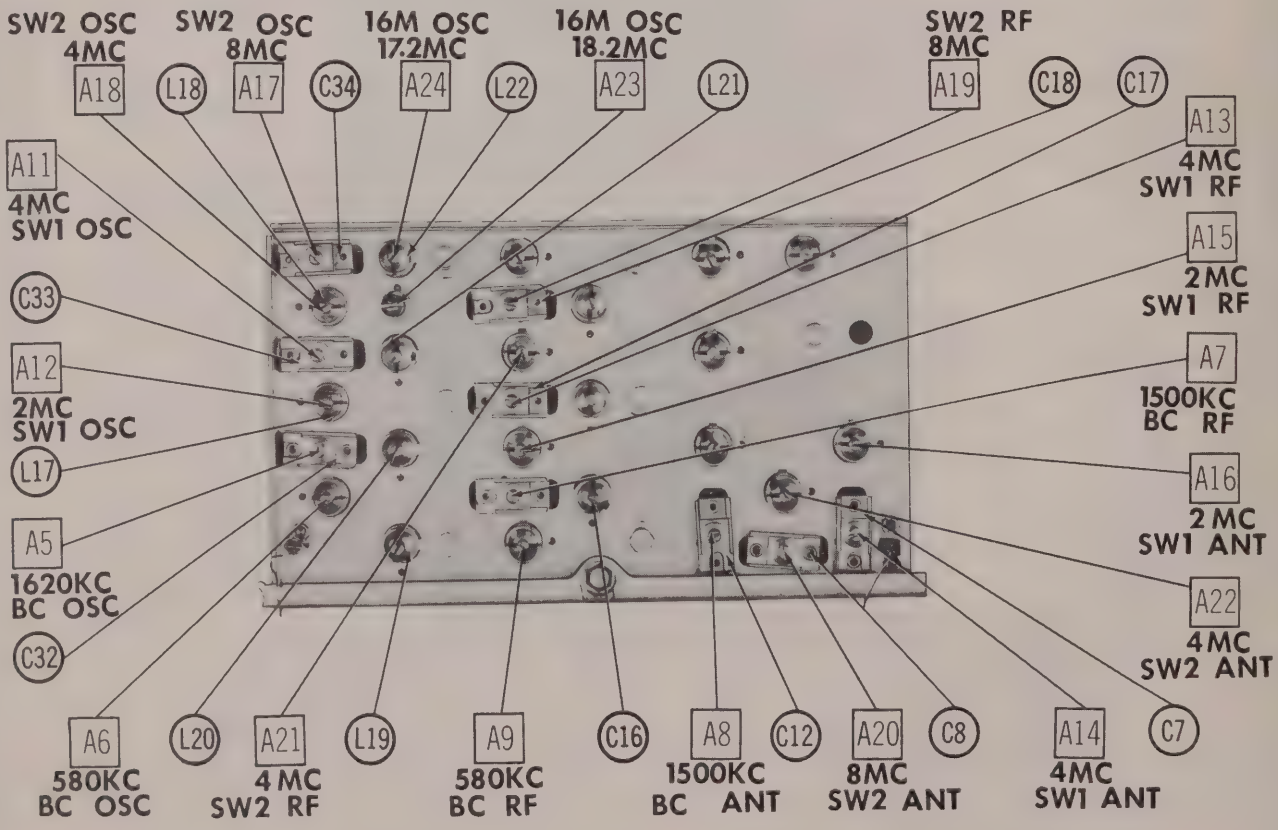
CHASSIS BOARD - CAPACITOR & RESISTOR IDENT.

RF CHASSIS - CAPACITOR, RESISTOR IDENT.

PHILCO
MODEL T-9 (CODES 124, 126)



RF CHASSIS - ALIGN. & INDUCTOR IDENT.



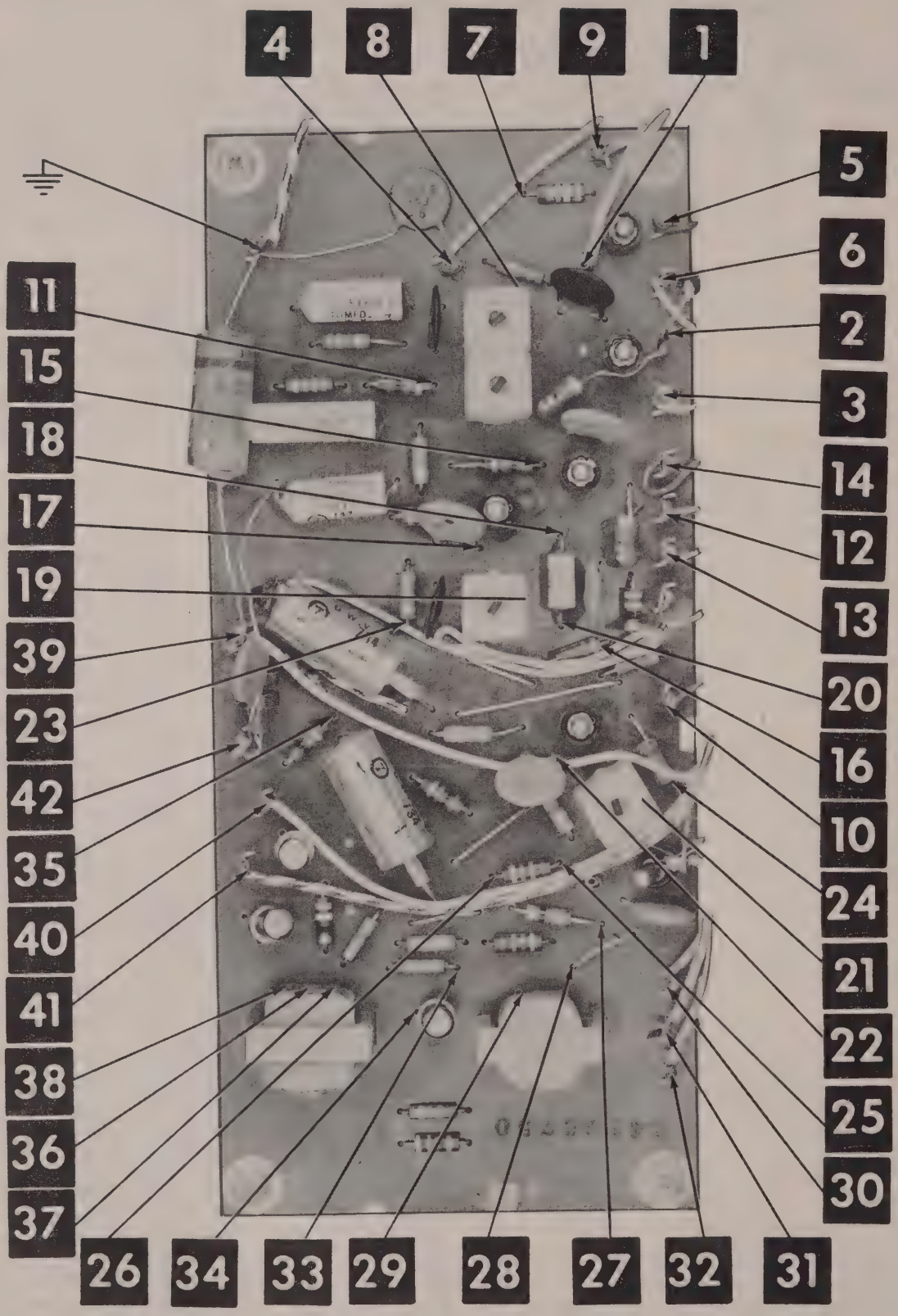
RF CHASSIS - ALIGN. & INDUCTOR IDENT.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Set left edge of pointer to coincide with the left hand end of dial scale lines.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05mfd	High side to base of X2. Low side to chassis.	455KC (400∿ Mod.)	BC	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1620KC	"	1620KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	2530KC	"	"	"		Retouch A5 for maximum output.
4.		"	580KC	"	580KC	"	A6	Adjust for maximum output while rocking tuning gang. Repeat Steps 2, 3, & 4.
5.		"	1500KC	"	Tune for 1500KC signal	"	A7, A8	Adjust for maximum output.
6.		"	580KC	"	Tune for 580KC signal	"	A9, A10	Adjust for maximum output. Repeat Steps 5 & 6.
7.	2.2mmf & 6.8Ω carbon resistor in series.	Highside to antenna terminal #1 (whip disconnected). Low side to chassis.	4MC	SWI	4MC	"	A11	Adjust for maximum output.
8.	"	"	4.910MC	"	"	"		Retouch A11 for maximum output.
9.	"	"	2MC	"	2MC		A12	Adjust for maximum output. Repeat Steps 7, 8, & 9.
10.	"	"	4MC	"	4MC	"	A13, A14	Adjust for maximum output.
11.	"	"	2MC	"	Tune for 2MC signal	"	A15, A16	Adjust for maximum output. Repeat Steps 10 & 11.
12.	"	"	8MC	SWII	8MC	Across voice coil	A17	Adjust for maximum output.
13.	"	"	8.910MC	"	"	"		Retouch A17 for maximum output.
14.	"	"	4MC	"	4MC	"	A18	Adjust for maximum output. Repeat Steps 12, 13, & 14.
15.	"	"	8MC		8MC	"	A19, A20	Adjust for maximum output.
16.	"	"	4MC	"	Tune for 4MC signal	"	A21, A22	Adjust for maximum output. Repeat Steps 15 & 16.
17.	"	"	18.2MC	16 Meter	18.2MC	"	A23	Adjust for maximum output.
18.	"	"	17.29MC	"	"	"		Retouch A23 for maximum output.
19.	"	"	17.2MC	"	17.2MC	"	A24	Adjust for maximum output. Repeat Steps 17, 18, & 19.
20.	"	"	17.7MC	"	Tune for 17.7 MC signal	"	A25, A26	Adjust for maximum output.
21.	"	"	15.2MC	19 Meter	15.2MC	"	A27	Adjust for maximum output.
22.	"	"	14.29MC	"	"	"		Retouch A27 for maximum output.
23.	"	"	15.2MC	"	15.2MC	"	A28, A29	Adjust for maximum output.
24.	"	"	11.7MC	25 Meter	11.7MC	"	A30	Adjust for maximum output.
25	"	"	10.79MC	"	"	"		Retouch A30 for maximum output.
26.	"	"	11.7MC	"	11.7 MC	"	A31, A32	Adjust for maximum output.
27.	"	"	9.7MC	31 Meter	9.7MC	"	A33	Adjust for maximum output.
28.	"	"	8.79MC	"	"	"		Retouch A33 for maximum output.
29.	"	"	9.7MC	"	"	"	A34, A35	Adjust for maximum output.



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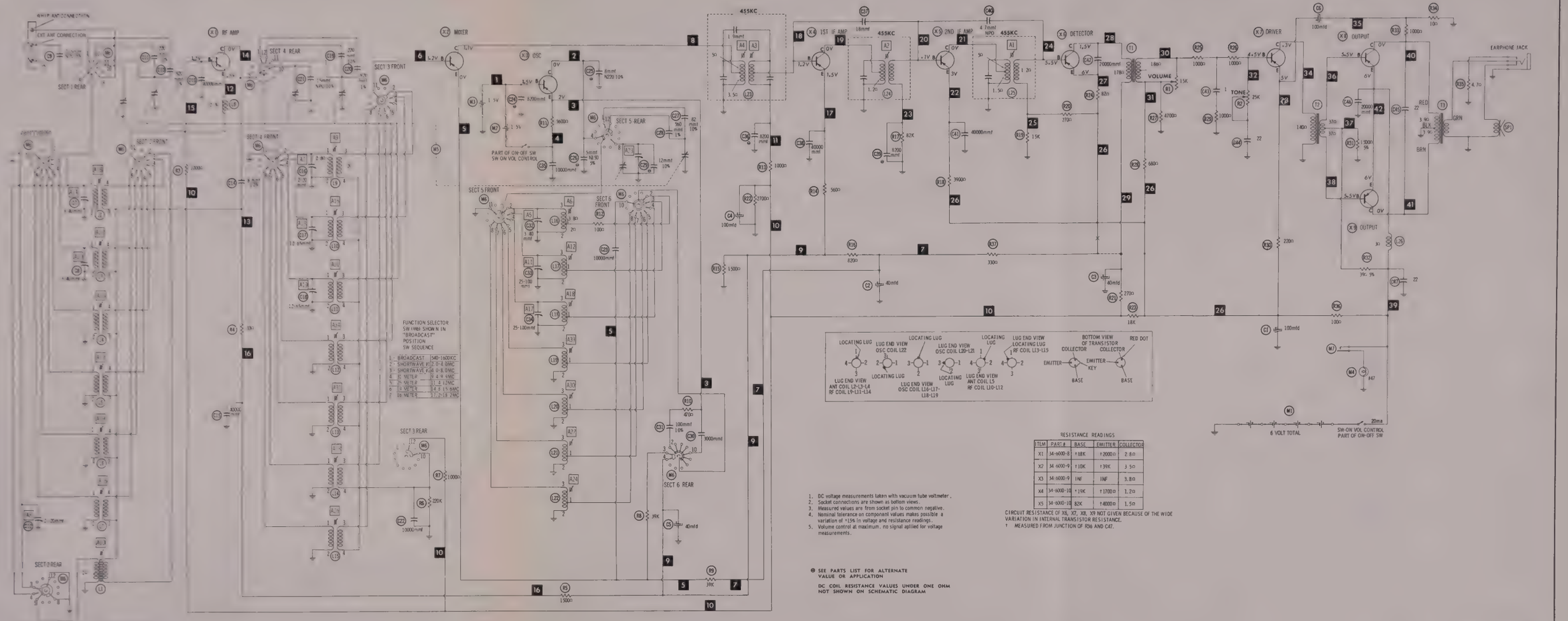
PRINTED BOARD



A PHOTOFACT STANDARD NOTATION SCHEMATIC

CIRCUITRACE

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1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

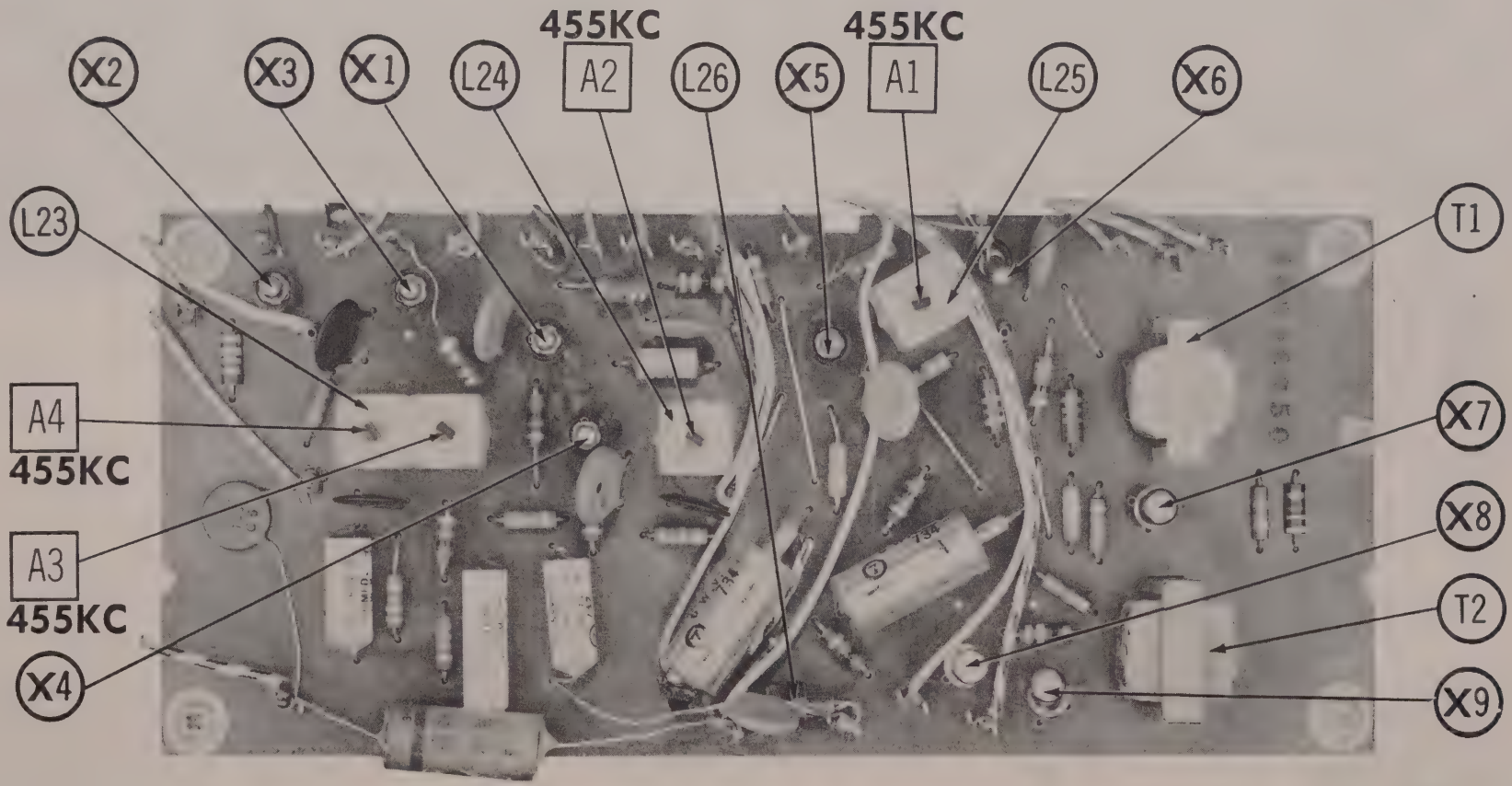
RESISTANCE READINGS

ITEM	PART #	BASE	EMITTER	COLLECTOR
X1	34-6000-8	†18K	†2000Ω	2.8Ω
X2	34-6000-9	†10K	†39K	3.5Ω
X3	34-6000-9	INF	INF	3.8Ω
X4	34-6000-10	†19K	†1700Ω	1.2Ω
X5	34-6000-10	82K	†4000Ω	1.5Ω

CIRCUIT RESISTANCE OF X6, X7, X8, X9 NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

† MEASURED FROM JUNCTION OF R36 AND C47.

PHILCO MODEL T-9 (Codes 124, 126)



CHASSIS BOARD - TRANSISTOR, INDUCTOR & ALIGN. IDENT.

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	PHILCO PART NO.	USE	REPLACEMENT DATA				NOTES	
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.		
X1	34-6000-8	RF Amp.					PNP	Note 1
X2	34-6000-9	Mixer					PNP	Note 2
X3	34-6000-9	Osc.			2N487		PNP	Note 2
X4	34-6000-10	1st IF Amp.			2N483		PNP	Note 3
X5	34-6000-10	2nd IF Amp.			2N483		PNP	Note 3
X6	34-6000-3	Detector			2N482		PNP	
X7	34-6001-16	Driver			2N362		PNP	
X8	34-6007	Output			2N360		PNP	Matched Pair
X9		Output			2N360		PNP	

Note 1. Code 126 uses Part #34-6000-5.
Note 2. Code 126 uses Part #34-6000-6.
Note 3. Code 126 uses Part #34-6000-12.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	100	6	30-2588-4	PWE6100	BBR100-6	TT6X100	ML100-6	MQ-680	TE-1102
C2	40	6	30-2588-3	PWE6040	NL40-6	TT3X40	ML40-6	MQ-650	TE-1095
C3	40	6	30-2588-3	PWE6040	NL40-6	TT3X40	ML40-6	MQ-650	TE-1095
C4	100	3	30-2588-2	PWE3100	NL100-6	TT6X100	ML100-3	MQ-380	TE-1102
C5	40	3	30-2588	PWE3040	NL40-3	TT3X40	ML40-6	MQ-350	TE-1057
C6	100	6	30-2588-4	PWE6100	BBR100-6	TT6X100	ML100-6	MQ-680	TE-1102

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES	
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.		
C7	3-40		31-6534-2							
C8	3-40		31-6534-2							
C9	7.5		30-1224-132					5TCCB-V75S 5%*	NPO	5%
C10	820		30-1220-75					MS-382S 1%*		1%
C11	220		60-10225417	1469-00022	MD-221	L10T22		5TCC-T22		10%
C12	2-20		31-6534-1							
C13	40000		30-1260-1		DF-403	BYB6S4				
C14	8		30-1224-144					5GA-V8S 10%*		10%
C15	40000		30-1260-1		DF-403	BYB6S4				
C16	2-20		31-6534-1							
C17	12-65		31-6534-3							
C18	12-65		31-6534-3							
C19	220		60-10225417	1469-00022	MD-221	L10T22		5TCC-T22		10%
C20	820		30-1220-75					MS-382S 1%*		1%
C21	15		62-015409011	NPO-SI15	TCZ-15	CTA6Q15C		5TCC-Q15	NPO	10%
C22	10000		30-1238-2	BPD-01	DD-103	BYA10S1	DC511	5HK-S1		
C23	10000		30-1238-2	BPD-01	DD-103	BYA10S1	DC511	5HK-S1		
C24	8200									①
C25	8								N220	10%②
C26	5								N150	5% ③
C27	82		60-00825437	1469-000082	DD-820	L10Q82		MS-482		10%
C28	560		30-1220-74					MS-356S 1%*		1%
C29	12			NPO-SI12	TCZ-12	CTA6Q12C		5GA-Q12S 10%*		10%④
C30	3000		30-1238-16		DD-302	BYA10D3	UC-523	5GA-D3		
C31	100		60-10105417	1469-0001	DD-101	L10T1	MCB-235	MS-31		10%
C32	3-40		31-6534-2							

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C33	25-100		31-6534-4						
C34	25-100		31-6534-4						
C35	10000		30-1238-2	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	①
C36	8200								
C37	18		62-018309021	SI-18	D6-180	LT6Q18	UC-5418	5GA-Q18	
C38	40000		30-1260-1		DF-403	BYB6S4			①
C39	8200								
C40	4.7		30-1224-29	NPO-SI-4.7	TCZ-4R7	CTA6V47C	ZT-5547	5TCCB-V47	NPO
C41	40000		30-1260-1		DF-403	BYB6S4			
C42	20000		30-1238-5	BPD-02	DD-203	BYB6S2		5HK-S2	
C43	.1	100	30-4650-47	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C44	.22	100	30-4650-49	P288N-22		CUB2P22	GEM-2022	2TM-P22	
C45	.22	100	30-4650-49	P288N-22		CUB2P22	GEM-2022	2TM-P22	
C46	20000		30-1238-5	BPD-02	DD-203	BYB6S2		5HK-S2	
C47	.22	100	30-4650-49	P288N-22		CUB2P22	GEM-2022	2TM-P22	

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
① Some versions may use 10000mmf in this application (Part #30-1262-1).
② Some versions may use 2.2mmf N3300 in this application (Part #30-1224-148).
③ Some versions may use 5mmf N5600 in this application (Part #30-1224-135).
④ Some versions may use 15mmf N330 in this application (Part #62-015409011).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	15K	½	33-5588-1		A47-15K-W		U21	Volume
B	Shaft				FS-3		Not Req.	
C	Switch				SWE-20		US-27	
R2A	25K	½	33-5587-7	B-29	A47-25K-W	Q13-120	U28A	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R3	1000Ω		66-2108340	
R4	33Ω		66-0338340	
R5	1500Ω		66-2158340	
R6	220K		66-4228340	
R7	1000Ω		66-2108340	
R8	39K		66-3398340	
R9	39K		66-3398340	
R10	470Ω		66-1478340	
R11	5600Ω		66-2568340	
R12	100Ω		66-1108340	
R13	1000Ω		66-2108340	
R14	560Ω		66-1568340	
R15	1500Ω		66-2158340	
R16	820Ω		66-1828340	
R17	82K		66-3828340	
R18	3900Ω		66-2398340	
R19	15K		66-3158340	
R20	270Ω		66-1278340	

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R21	270Ω		66-1278340	
R22	2700Ω		66-2278340	
R23	18K		66-3188340	
R24	82Ω		66-0828340	
R25	1000Ω		66-2108340	
R26	1000Ω		66-2108340	
R27	4700Ω		66-2478340	
R28	680Ω		66-1688340	
R29	1000Ω		66-2108340	
R30	220Ω		66-1228340	
R31	1500Ω 5%		66-2158240	
R32	39Ω 5%		66-0398240	
R33	1000Ω		66-2108340	
R34	10Ω		66-0188340	
R35	4.7Ω		66-9478360	
R36	100Ω		66-1108340	
R37	330Ω		66-1338340	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	76-10297					2.0MC - 4.0MC
L2	SW1 Ant. Coil	32-4705-2					4.0MC - 8.0MC
L3	SW2 Ant. Coil	32-4705-3					9.4MC - 9.9MC
L4	31M Ant. Coil	32-4705-4					11.4MC - 12.0MC
L5	25M Ant. Coil	32-4705-5					14.8MC - 15.6MC
L6	19M Ant. Coil	32-4705-6					17.2MC - 18.2MC
L7	16M Ant. Coil	32-4705-7					3.3 Microhenries ①
L8	RF Choke	32-4422-10					
L9	BC RF Coil	32-4707-1					2.0MC - 4.0MC
L10	SW1 RF Coil	32-4707-2					4.0MC - 8.0MC
L11	SW2 RF Coil	32-4707-3					9.4MC - 9.9MC
L12	31M RF Coil	32-4707-4					11.4MC - 12.0MC
L13	25M RF Coil	32-4707-5					14.8MC - 15.6MC
L14	19M RF Coil	32-4707-6					17.2MC - 18.2MC
L15	16M RF Coil	32-4707-7					Tapped@ . 2Ω
L16	BC Osc. Coil	32-4706-1					2.0MC - 4.0MC
L17	SW1 Osc. Coil	32-4706-2					4.0MC - 8.0MC
L18	SW2 Osc. Coil	32-4706-3					9.4MC - 9.9MC
L19	31M Osc. Coil	32-4706-4					11.4MC - 12.0MC
L20	25M Osc. Coil	32-4706-5					14.8MC - 15.6MC
L21	19M Osc. Coil	32-4706-6					17.2MC - 18.2MC
L22	16M Osc. Coil	32-4706-7					Pri. Tapped@. 5Ω;
L23	1st If	32-4708-1					Sec. Tapped.
L24	2nd IF	32-4708-2					Pri. Tapped@1. 2Ω
L25	3rd IF	32-4708-3					Pri. Tapped@. 5Ω
L26	RF Choke	32-4729-1					100 Microhenries

TRANSFORMER (INPUT)

ITEM No.	TURNS RATIO PRI.	TURNS RATIO SEC.	REPLACEMENT DATA: PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	1	.7	32-8742-1				TR-10 ①		① Do not use center tap.

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO PRI.	TURNS RATIO SEC.	REPLACEMENT DATA: PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	1.5	1	32-8824						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: PHILCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T3	150Ω CT	3-4Ω	32-8823							
	TURNS RATIO 6.7	1								

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA: PHILCO PART No.	QUAM PART No.	NOTES
SP1	5 1/4"	PM	3-4Ω	36-1669-4	52A21 ①	① Enlarge Panel Mounting Holes

BATTERIES

ITEM No.	VOLTAGE	PHILCO PART No.	REPLACEMENT DATA: BURGESS "A"	BURGESS "B"	EVEREADY "A"	EVEREADY "B"	MALLORY "A"	MALLORY "B"	NOTES
M1	6V			2R ①		950 ①		M-13R ①	① 4 Used
M2	1.5V			2R		950		M-13R	
M3	1.5V			2R		950		M-13R	

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M4	Lamp	34-2068	#47
M5	Tuning Cap.	31-2784-2	Less Trimmer, 6 Gang,
	Tuning Cap.	31-2784-1	With Trimmer, 6 Gang
M6	Band Switch	328-0142	Assembly, Partially Wired, Includes Gears and Shaft
M7	Switch	42-2075-3	Dial Light, (SPST, Momentary Contact, Slide Type)
	Printed Board	54-6324-3	Code 124
	Printed Board	54-6324-4	Code 126

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	28-11588-2	Off-On-Volume, Tuning
Knob	28-11588-1	Tone, Band Switch
Knob	56-10042-1	Whip Antenna
Logging Scale	28-11598	Band Indicator
Window	54-6323-1	Dial Scale
Cabinet	11215	
Pointer	28-9739-3	
Antenna	76-6988-1	Short Wave Whip

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

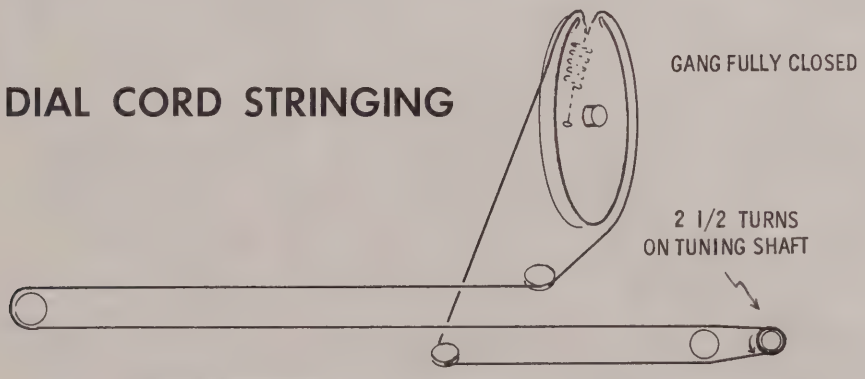
PILOT MODEL HF-42

PILOT MODEL HF-42

TRADE NAME	Pilot Model HF-42		
MANUFACTURER	Pilot Radio Corp., 37-06 36th St., Long Island City 1, N. Y.		
TYPE SET	AC Operated FM-AM Receiver		
TUBES	Sixteen		
POWER SUPPLY	105-120 Volts AC - 60 Cycles	RATING	130 Watts, 1.22 Amp. @117 Volts AC (FM)
TUNING RANGE - BROADCAST	535 - 1720KC	Freq. Mod.	88-108MC

PILOT MODEL HF-42

DIAL CORD STRINGING



INDICATOR ZERO SET ADJUSTMENT (R6)

1. TURN SELECTOR SWITCH TO FM.
2. REMOVE 6AL5 (V7).
3. ADJUST R6 UNTIL THE SHADOW GAP EDGES OF V8 ARE PARALLEL.
4. REPLACE 6AL5 (V7).

READJUSTMENT MAY BE NECESSARY IF V8 IS CHANGED.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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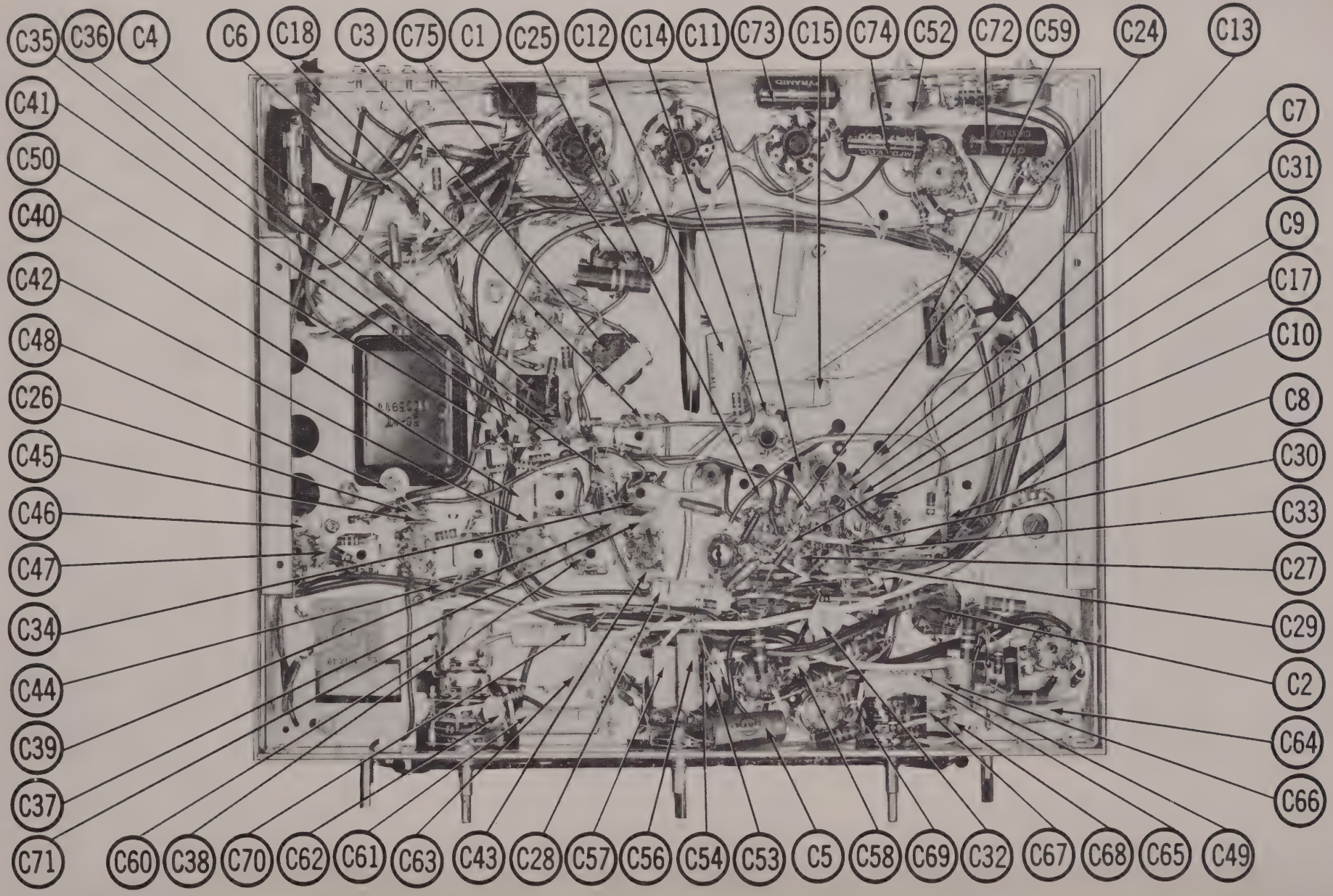
H755

SET 429 FOLDER 11



CHASSIS BOTTOM VIEW - CAPACITOR IDENT.

CHASSIS BOTTOM VIEW - RESISTOR IDENT.

MODEL HF-42

PILOT

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BA6	1.3meg	0Ω	0Ω	.1Ω	† 870Ω	† 6000Ω	1Ω		
V2	6U8	† 1400Ω	1meg	† 6000Ω	.1Ω	.2Ω	†1400Ω	0Ω	1.4Ω	5600Ω ◓ 22K
V3	12AT7	† 400Ω	1.6meg	3200 Ω	.1Ω	.1Ω	† 430K	1.2meg	4300Ω	0Ω
V4	6BA6	1.3meg	0Ω	0Ω	.1Ω	†1400Ω	† 6000Ω	0Ω		
V5	6AU6	150K	0Ω	0Ω	.1Ω	†1400Ω	† 1400Ω	0Ω		
V6	6AU6	150K	0Ω	0Ω	.1Ω	†68K	†68K	0Ω		
V7	6AL5	200K	100K	130Ω	130Ω	0Ω	0Ω	100Ω		
V8	6DA5 EM81	650K	1700Ω	†400Ω	0Ω	.1Ω	NC	† 220K	TP	† 400Ω
V9	12AX7	†† 130K	2.2meg	0Ω	130Ω	130Ω	†† 155K	110K	3300Ω	130Ω
V10	12AX7	†† 130K	100K	2200Ω	130Ω	130Ω	†† 130K	170K	2200Ω	130Ω
V11	6C4	†† 240K	NC	330Ω	330Ω	†† 240K	0Ω	5600Ω		
V12	12AU7	†† 70K	†† 240K	47K	330Ω	330Ω	†† 240K	470K	4000Ω	330Ω
V13	6L6GB	NC	330Ω	†† 230Ω	†† 130Ω	470K	NC	330Ω	330Ω	
V14	6L6GB	NC	330Ω	†† 270Ω	†† 145Ω	470K	NC	330Ω	330Ω	
V15	6X4	15Ω	NC	0Ω	.1Ω	NC	16Ω	¶		
V16	5Y3GT	NC	¶	NC	51Ω	NC	54Ω	NC	¶	

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 7 OF V15.

†† MEASURED FROM PIN 2 OF V16.

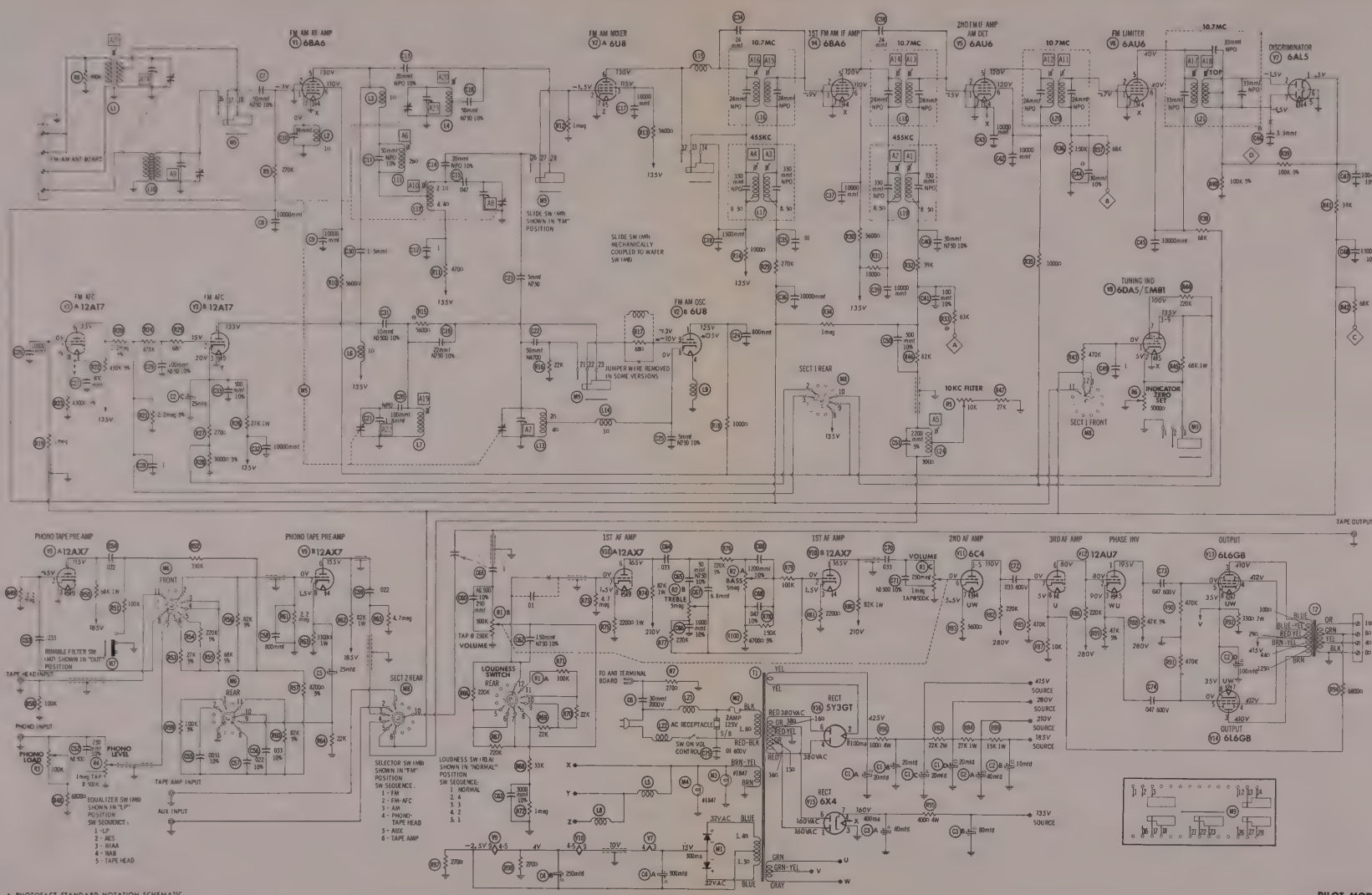
◓ MEASURED IN "AM" POSITION

NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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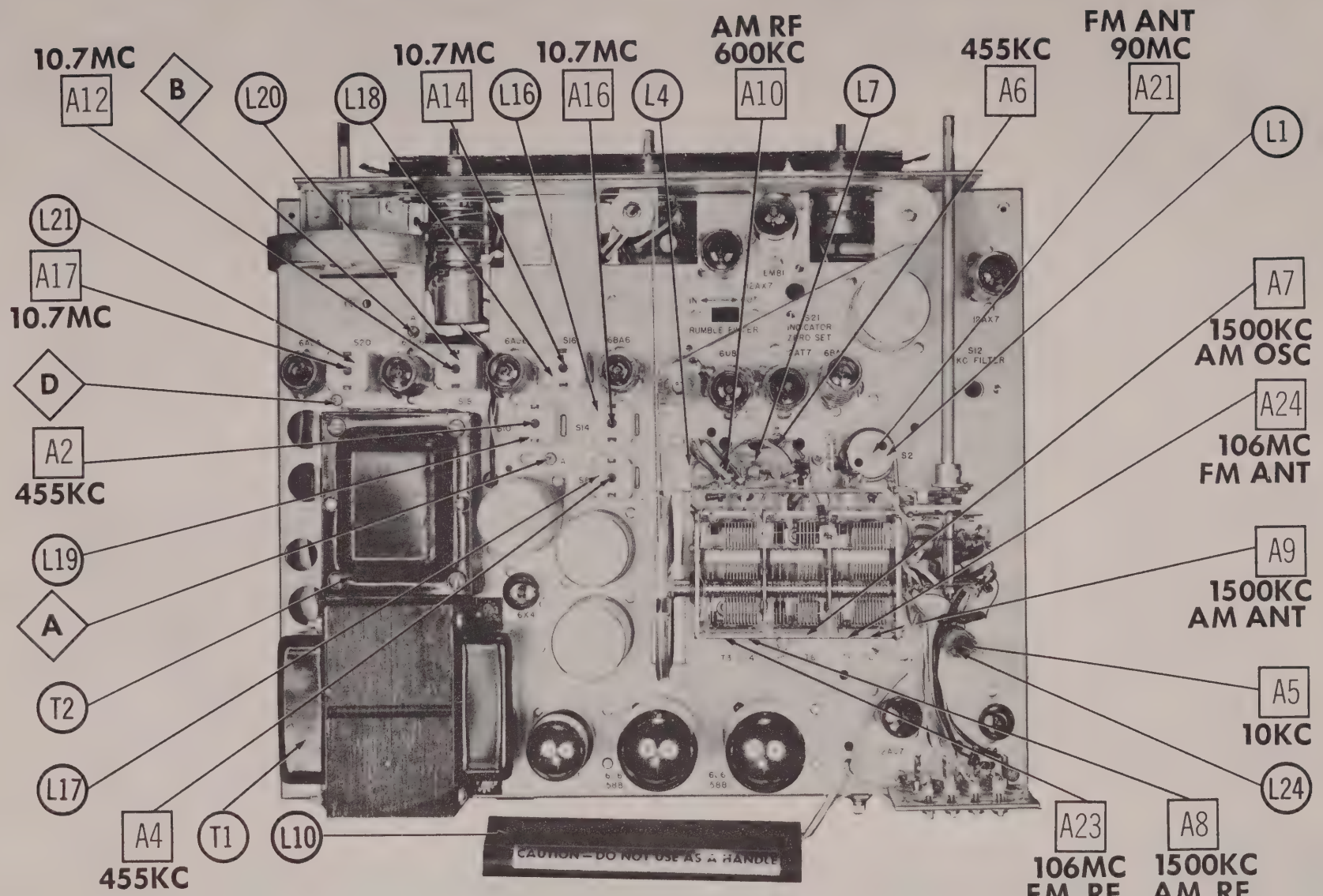
PILOT MODEL
HF-42



CHASSIS TOP VIEW - ALIGNMENT, INDUCTOR & TRANSFORMER IDENT.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01mfd	Highside to pin 2 (grid) of 6U8 (V2). Low side to chassis.	455KC (400∿ Mod.)	AM	Tuning gang fully open	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	Highside to point Ⓐ. Low side to chassis.	10KC	"	"	Vert. Amp. (use scope) to tape output jack. Low side to chassis.	A5, R5	Adjust for MINIMUM amplitude.
3.	"	Highside to AM antenna terminal. Low side to chassis.	455KC (400∿ Mod.)	"	"	DC probe to point Ⓐ. Common to chassis.	A6	Adjust for MINIMUM deflection
4.	"	"	1500KC	"	1500KC	"	A7, A8, A9	Adjust for maximum deflection.
5.	"	"	600KC	"	600KC	"	A10	Adjust for maximum deflection while rocking tuning gang.

FM IF ALIGNMENT, USING AM SIGNAL GENERATOR & VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	200mmf	Highside to pin 2 (grid) of 6U8 (V2). Low side to chassis.	10.7MC (Unmod.)	FM	Point of non-interference	DC probe to point Ⓑ. Common to chassis.	A11, A12, A13, A14, A15, A16	Adjust for maximum deflection.
7.	"	"	"	"	"	DC probe thru 1meg to point Ⓒ. Common to chassis	A17	"
8.	"	"	"	"	"	DC probe to point Ⓒ. Common to point Ⓓ.	A18	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR & OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	200mmf	Highside to pin 2 (grid) of 6U8 (V2). Low side to chassis.	10.7MC (450KC SWP)	FM	Point of non-interference	Vert. Amp to point Ⓑ. Low side to chassis.	A11, A12, A13, A14, A15, A16	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
7.	"	"	"	"	"	Vert. Amp thru 27K to point Ⓒ. Low side to chassis.	A17	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
8.	"	"	"	"	"	Vert. Amp to point Ⓓ. Low side to chassis.	A18	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A17 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	270Ω Carbon Resistor	Highside to FM antenna terminal (D1). Low side to chassis.	90MC (Unmod.)	FM	90MC	DC probe to point Ⓑ. Common to chassis.	A19, A20, A21	Adjust for maximum deflection.
10.	"	"	106MC	"	106MC	"	A22, A23 A24	Adjust for maximum deflection. Repeat Step 9.

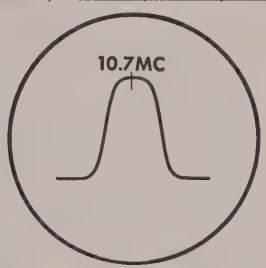


FIG. 1

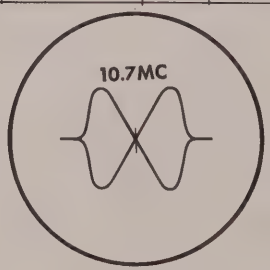
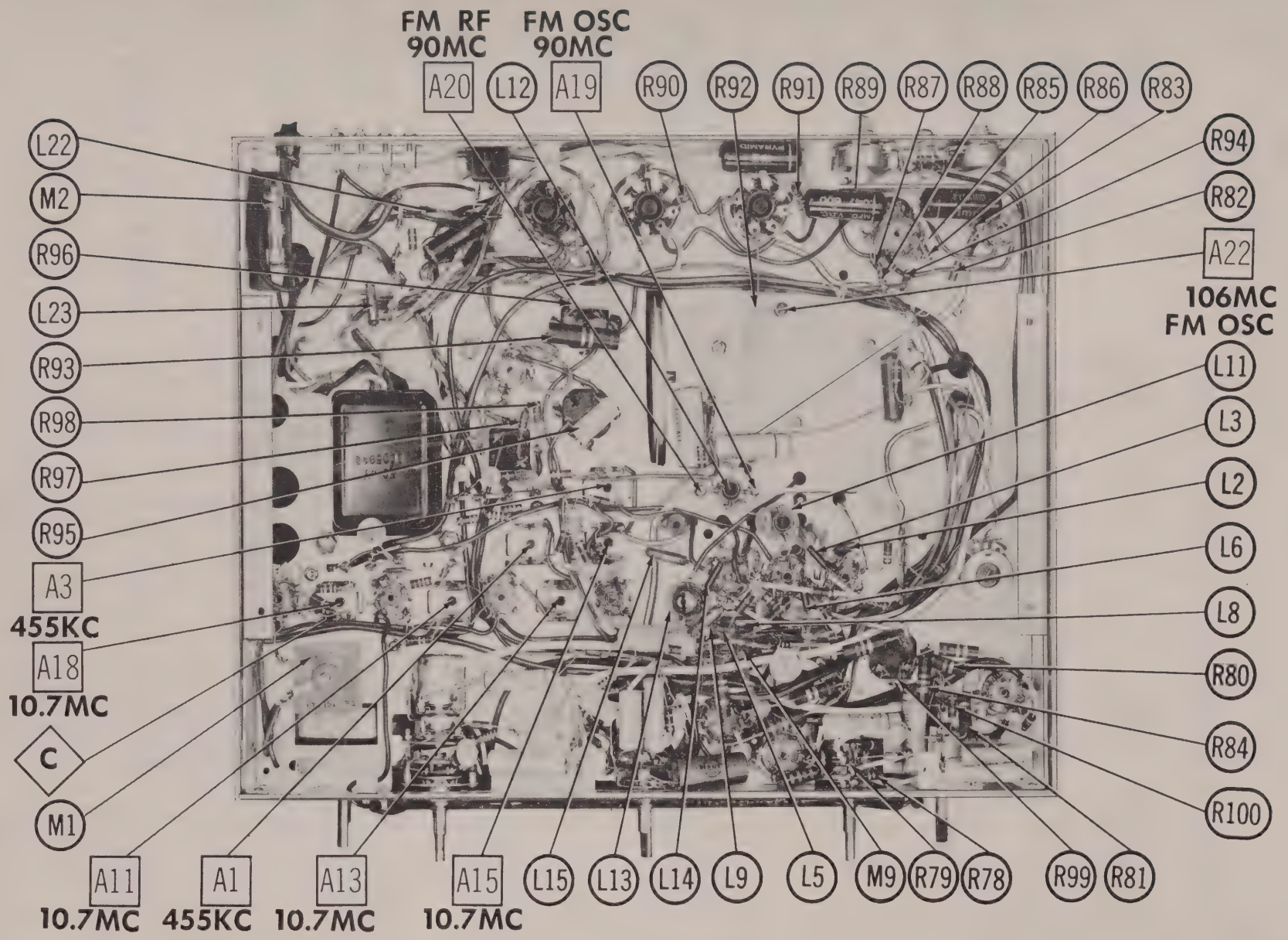


FIG. 2

CHASSIS STAMP	ALIGN #	CHASSIS STAMP	ALIGN #	CHASSIS STAMP	ALIGN #	CHASSIS STAMP	ALIGN #	CHASSIS STAMP	ALIGN #
S1	A19	S8	A3	S14	A15	S20	A18	T5	A22
S2	A21	S9	A2	S15	A14	S21	R6	T6	A7
S3	A20	S10	A1	S16	A13	T1	A24		
S5	A10	S11	A5	S17	A12	T2	A9		
S6	A6	S12	R5	S18	A11	T3	A23		
S7	A4	S13	A16	S19	A17	T4	A8		



CHASSIS BOTTOM VIEW - ALIGNMENT, INDUCTOR, RESISTOR & MISC. IDENT.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM-AM RF Amplifier	6BA6	
V2	FM AM Mixer-FM AM Osc.	6U8	
V3	FM AFC	12AT7	
V4	1st FM-AM IF Amplifier	6BA6	
V5	2nd FM IF Amp-AM Det. AVC	6AU6	
V6	FM Limiter	6AU6	
V7	Discriminator	6AL5	

ITEM No.	USE	TYPE	NOTES
V8	Tuning Indicator	6DA5/ EM81	
V9	Preamplifier	12AX7	
V10	1st AF Amplifier	12AX7	
V11	2nd AF Amplifier	6C4	
V12	3rd AF Amp. -Phase Inv.	12AU7	
V13	Output	6L6GB	①
V14	Output	6L6GB	①
V15	Rectifier	6X4	
V16	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲20	450	24-149	AFH4-14	D0130	FP444	TMQ-12	Q-040	TVL-4763
B	20	450							
C	▲20	450							
D	■20	450							
C2A	▲40	400	24-156	AFH4-114-75	C1040	FP431.4		Q-247	R2724 *
B	■10	400			BBR25-25	TC48		MT-0550	
C	25	25							
D	▲100	50							
C3A	▲40	250	24-115	AFH2-40-80	XB0243	FP227.5	TMD-33	D-140	TVL-2582
B	▲80	250							
C4A	▲500	35	24-135		BR2505				R2708 *
B	▲250	35			BR5005				
C5	25	25	24-50	PRS25V25	BBR25-25	TC36	TD-25-25	MT-0225	TVA-1205

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	30	2000			DD30-300			20GAB-Q3	
C7	50				TCN-50	C10Q5U			N750 10%
C8	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C9	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C10	39			DI-000039	DD-390	L10Q39	UC-5439	5GA-Q39	
C11	50			NPO-DI50	DTZ-50	C10Q5C		5TCC-Q5	NPO 10%
C12	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C13	20			NPO-DI20	DTZ-20	C10Q2C	ZT-542	5TCC-Q2	NPO 10%
C14	20			NPO-DI20	DTZ-20	C10Q2C	ZT-542	5TCC-Q2	NPO 10%
C15	.047	400		P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C16	50				TCN-50	C10Q5U			N750 10%
C17	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C18	1500			BPD-0015	DD-152	BYA10D15	DC5215	5HK-D15	
C19	22			N750-DI22	DTN-22	C10Q22U		5TCU-Q22	N750 10%
C20	100			NPO-SI100	TCZ-100	C10T1C	ZT-531	5TCC-T1	NPO
C21	1-8								
C22	50								N4700
C23	5			N750-SI5		C10V5U	NT-555	5TCUB-V5	N750
C24	800			BPD-0008	DD-801	L10T8		5GA-T8	
C25	5			N750-SI5		C10V5U	NT-555	5TCUB-V5	N750 10%
C26	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C27	800			BPD-0008	DD-801	L10T8		5GA-T8	
C28	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C29	100								N150 10%
C30	1.5			NPO-SI1.5	TCZ-1R5	CTAV15C	ZT-5515	5TCCB-V15	
C31	10								N1500 10%
C32	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C33	500				D6-501	5R5T5	MCB245	MS-35	10%
C34	.24								
C35	.01	400		P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C36	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C37	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C38	.24								
C39	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C40	50				TCN-50	C10Q5U			N750 10%
C41	100			NPO-DI100	DD-101	L10T1	MCB235	MS-31	10%
C42	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C43	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C44	30				DD-300	L10Q3		MS-43	① 10%
C45	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C46	3.3			NPO-SI3.3	TCZ-3R3	CTA6V33C	ZT-5533	5TCCB-V33	②
C47	100			NPO-DI100	DD-101	L10T1	MCB235	MS-31	10%
C48	1500					1R5D15	MCB456	MS-215	10%
C49	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C50	500				D6-501	5R5T5	MCB245	MS-35	10%
C51	2200			1464-0022		1R5D22		MS-222	5%
C52	250								N1500 10%
C53	.033	400		P488N-033	DF-303	CUB4S33	GEM-4133	4TM-S33	
C54	.022	400		P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C55	.0051	100							10%
C56	.033	400							10%
C57	.022	400							10%
C58	800			BPD-0008	DD-801	L10T8		5GA-T8	
C59	.022	400		P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C60	250								N1500 10%
C61	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C62	150			N750-DI150	DTN-150	C10T15C		5TCU-T15	N750 10%
C63	3000					1R5D3	MCB461	MS-23	10%
C64	.033	400		P488N-033	DF-303	CUB4S33	GEM-4133	4TM-S33	
C65	50				TCN-50	C10Q5U			N750 10%
C66	1000					1R5D1	MCB255	MS-21	10%
C67	6.8			NPO-SI6.8	TCZ-6R8	CTA6V68C	ZT-5568	5TCCB-V68	
C68	.047	400							10%
C69	1200					1R5D12		MS-212	10%
C70	.033	400		P488N-033	DF-303	CUB4S33	GEM-4133	4TM-S33	
C71	250								N1500 10%
C72	.033	600		P688N-033	DF-303	CUB6S33	GEM-6133	6TM-S33	
C73	.047	600		P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C74	.047	600		P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C75	.01	600		P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	

① Some versions use 33mmf in this application.
② Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PILOT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	Switch		100-120					Loudness
B	500K	1/2						Volume, Tap ⓐ 250K
C	1meg	1/2						Volume, Tap ⓐ 500K
D	Switch							Loudness-Contour
R2A	5meg	1/2	37-34				■ UE3852	Bass
B	5meg	1/2						Treble
R3A	100K	1/2	39-32	AB-40	A47-100K-S	Q11-128	U41	Phono Load
B	Shaft			AK-1	FKS-1/4	PQ	Not Req.	
R4A	1meg	1/2	39-41	ABT-74	A47F5-1meg	Q19-137X	UT443	Phono Level, Tap ⓐ 500K
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	
R5A	10K	1/2	39-46	AB-14	B47-10KS	B11-116	TA14L	10KC Filter
B	Shaft			AK-1	Not Req.	SK2	Not Req.	
R6A	5000Ω	1/2	39-42	AB-10	B47-5000-S	Q11-114	TA53L	Indicator Zero Set
B	Shaft			AK-1	Not Req.	RQ	Not Req.	

■ "STA-LOC" Equivalent: FB56A, OS812, RU56A, IS1312.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	PILOT PART No.	NOTES
R7	270Ω			
R8	390K			
R9	270K			
R10	5600Ω			
R11	470Ω			
R12	1meg			
R13	5600Ω			①
R14	1000Ω			
R15	5600Ω			
R16	22K			
R17	68Ω			
R18	1000Ω			
R19	1meg			
R20	2.2meg 5%			
R21	2.2meg 5%			
R22	430K 5%			
R23	4300Ω 5%			
R24	470K			
R25	68Ω			
R26	27K	1		
R27	270Ω			
R28	3000Ω 5%			
R29	270K			
R30	5600Ω			
R31	1000Ω			
R32	39K			
R33	63K			②
R34	1meg			
R35	1000Ω			
R36	150K			
R37	68K			
R38	68K			
R39	100K 5%			
R40	100K 5%			
R41	39K			
R42	68K			
R43	470K			
R44	220K			
R45	68K	1		
R46	82K			
R47	27K			
R48	6800Ω			
R49	2.2meg			
R50	68K	1		
R51	100K			
R52	330K			
R53	27K 5%			
R54	220K 5%			
R55	68K 5%			
R56	82K 5%			
R57	8200Ω 5%			
R58	100K			
R59	100K 5%			
R60	82K 5%			
R61	2.2meg			
R62	82K	1		
R63	3300Ω	1		
R64	22K			
R65	4.7meg			
R66	220K			
R67	220K			
R68	33K			
R69	22K			
R70	22K			
R71	100K			
R72	1meg			
R73	4.7meg			
R74	82K	1		
R75	2200Ω	1		
R76	220K 5%			
R77	220K			
R78	150K			
R79	100K			
R80	82K	1		
R81	2200Ω			
R82	220K			
R83	5600Ω			
R84	27K	1		
R85	470K			
R86	220K			
R87	10K			
R88	47K 5%			
R89	47K 5%			
R90	470K			
R91	470K			
R92	330Ω	7		
R93	22K	2		
R94	6800Ω	1		
R95	400Ω	4		
R96	100Ω	4		
R97	270Ω			
R98	270Ω			
R99	15K	1		
R100	4700Ω 5%			

① Some versions use 6800Ω in this application.

② Some versions use 68K in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA PILOT PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Coil	70-81					
L2	Cathode Choke	75-33	19-1004	SW-631	4529		5 Microhenries
L3	RF Choke	75-33	19-1004	SW-631	4529		5 Microhenries
L4	FM RF Coil	71-42					
L5	Fil. Choke						1.7 Microhenries
L6	RF Choke	75-33	19-1004	SW-631	4529		5 Microhenries
L7	FM Osc. Coil	72-77					
L8	Fil. Choke	75-19	19-1001	BC-562	4604		1.5 Microhenries
L9	Fil. Choke	75-19	19-1001	BC-562	4604		1.5 Microhenries
L10	Loopstick	270-54					
L11	455KC Wave Trap	79-102					
L12	AM RF Coil	71-43					
L13	AM Osc. Coil	72-78					
L14	Cathode Choke	75-33	19-1004	SW-631	4529		5 Microhenries
L15	RF Choke	75-19	19-1001	BC-562	4604		1.5 Microhenries
L16	1st FM IF	273-151	16-3487	FM-254	1463		

COILS (cont)

ITEM No.	USE	REPLACEMENT DATA PILOT PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L17	1st AM IF	273-129	16-6758	BC-352	12-C1	RF-1	
L18	2nd FM IF	273-151	16-3487	FM-254	1463		
L19	2nd AM IF	273-129	16-6758	BC-353	12-C2	RF-2	
L20	3rd FM IF	273-151	16-3487	FM-254	1463		
L21	Discriminator	279-77	17-3494	FM-253	1464		
L22	Line Choke	75-19	19-1001	BC-562	4604		1.5 Microhenries
L23	Line Choke	75-19	19-1001	BC-562	4604		1.5 Microhenries
L24	10KC Filter Choke	79-106					

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA PILOT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @1.2A	750VCT @.100A Tap @ 300 VCT @.040A	32 VCT @.3A	55-52						
	SEC. 3	SEC. 4	SEC. 5							
	5V @1.8A	6.3VCT @2.1A	6.3V @3A							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA PILOT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5600Ω CT Screen Taps @ 500Ω CT	16Ω Taps @ 8Ω 4Ω	56-47							

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA PILOT PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.300A	110-519		61-2151	3N33-1C1-RV	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA PILOT PART No. FUSE	PILOT PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	3AG	2A 125V S/B	111-16		313002. (2A 125V S/B)	357001	MDL2	4405

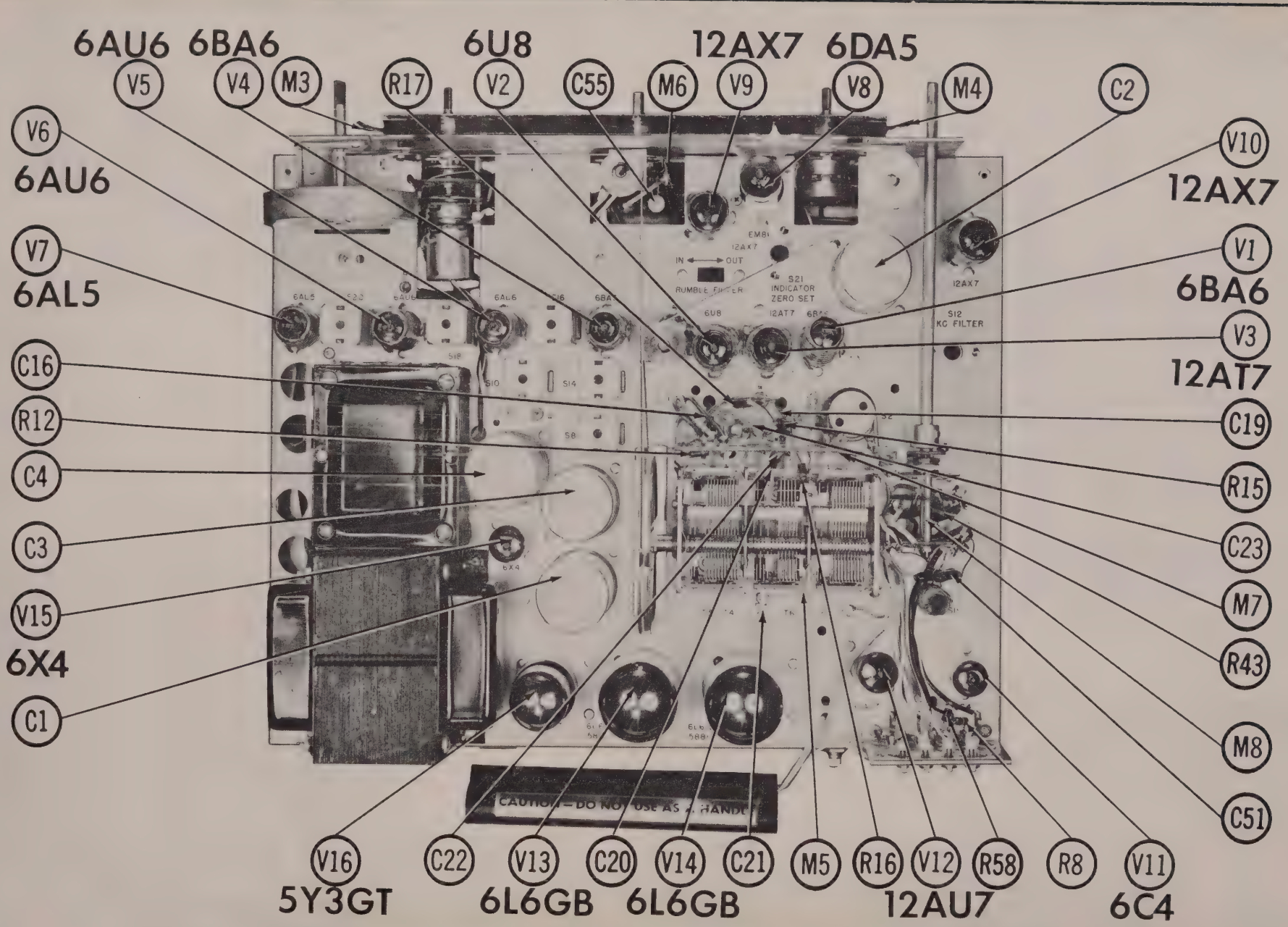
MISCELLANEOUS

ITEM No.	PART NAME	PILOT PART No.	NOTES
M3	Lamp	68-10	#1847
M4	Lamp	68-10	#1847
M5	Tuning Cap	26-60	6 Gang, (AM Sections: Ant. 23-488mmf, RF. 21-485mmf, Osc. 24-172mmf)
M6	Switch	100-112	Equalizer, Rotary, Wafer Type
M7	Switch	101-41	Rumble Filter, SPST, Slide Type
M8	Switch	100-111	Selector, Rotary, Wafer Type
M9	Switch	101-43	Band, 5P3T, Slide Type (Mechanically Ganged To M8)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



CHASSIS TOP VIEW - CAPACITOR, RESISTOR, TUBE & MISC. IDENT.

PHOTOFACT* Folder

EIA

ROLAND MODEL 4TR

ROLAND MODEL 4TR

TRADE NAME	Roland Model 4TR
MANUFACTURER	Roland Radio Corp., 12-30 Anderson Ave., Mount Vernon, N. Y.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	9 Volts DC
RATING	10.5MA@9 Volts DC
TUNING RANGE—BROADCAST	535 - 1620KC

ROLAND MODEL 4TR

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1600KC	1600KC	"	A3	"
3.		"	600KC	600KC	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang. Repeat Steps 2 & 3.
4.		"	1400KC	Tune for 1400KC signal	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H791

SET 429 FOLDER 12

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N411	Converter		2N411	2N486	2N411	PNP Note 1
X2	2N409	IF Amplifier		2N409	2N483	2N409	PNP Note 2
X3	GT20R	AF Amplifier			2N362	2N381	PNP Note 3
X4	GT81	Output			2N631	2N383	PNP Note 4

Note 1. Alternate type GT760 (Part #359002).
Note 2. Alternate type GT761 (Part #359003).
Note 3. Alternate type GT20 (Part #359001).
Note 4. Alternate type GT81HS (Part #359006).

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ROLAND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	50	10	①	XPP-10050	NL50-10	TT10X50	ML50-15	MQ-0150	TE-1119
C2	5	12	581025 ②	XPP-12005	NL5-15	TT12X5	ML5-15		TE-1127
C3	10	50	581023	PWE50010	NL10-50	TT50X10	ML10-50	MQ-0510	TE-1304
C4	10	50	581023	PWE50010	NL10-50	TT50X10	ML10-50	MQ-0510	TE-1304
C5	10	12	581022 ③	XPP-12010	NL10-15	TT12X10	ML10-15		TE-1128

① Some versions may use a 40mfd in this application. (Part No. 581024).
② Some versions may use a 10mfd in this application. (Part No. 581022).
③ Some versions may use a 5mfd in this application. (Part No. 581025).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	ROLAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	20000			BPD-02	DA-203	BYB6S2	TA-120	5HK-S2	
C7	20000			BPD-02	DDM-203	BYB6S2	BT-120	5HK-S2	
C8	20000			BPD-02	DDM-203	BYB6S2	BT-120	5HK-S2	
C9	4.7						CNO-547		5%
C10	20000			BPD-02	DA-203	BYB6S2	TA-120	5HK-S2	
C11	20000			BPD-02	DA-203	BYB6S2	TA-120	5HK-S2	
C12	20000			BPD-02	DA-203	BYB6S2	TA-120	5HK-S2	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ROLAND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	5000Ω	½	360411	B-11		Q13-114	U12	Volume
B	Shaft			Not Req.		Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*		76-1	US-26	

* Use KR with CRL "Red Label" controls and KB with "Blue Label controls.

RESISTORS

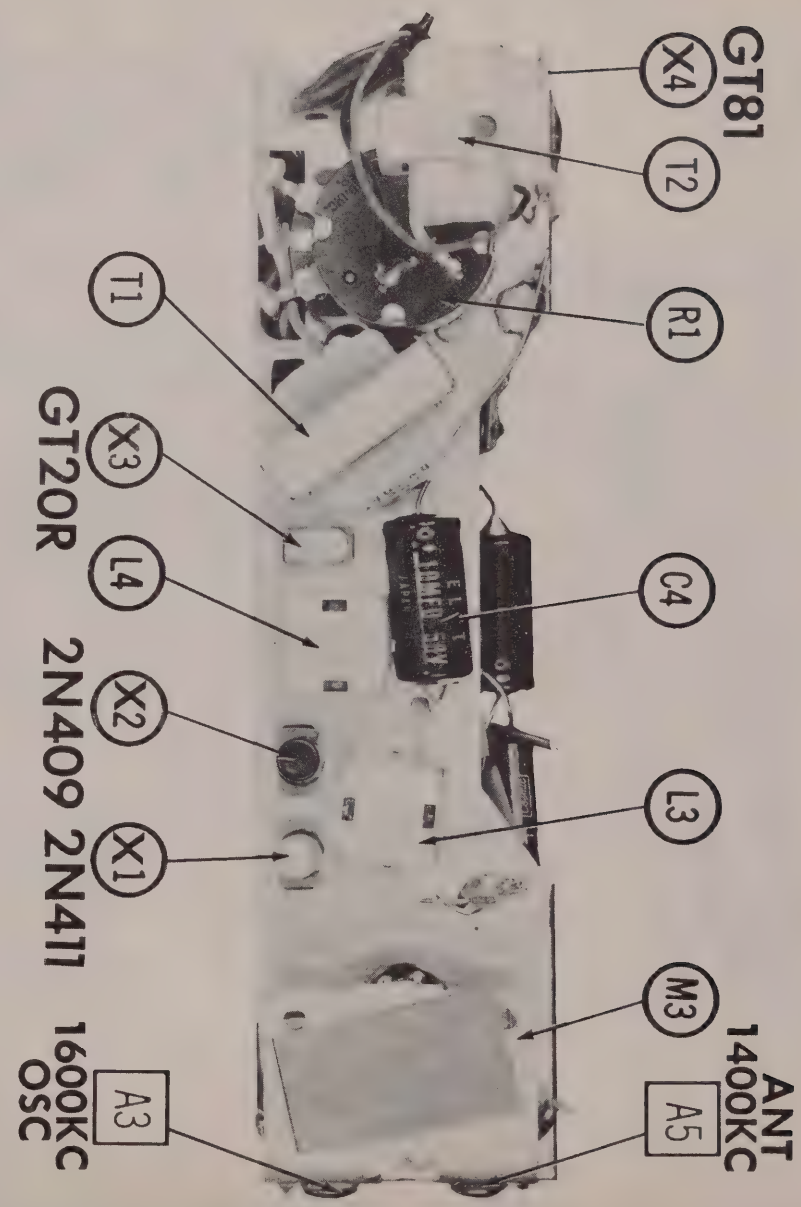
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ROLAND PART No.	NOTES
	OHMS	WATT		
R2	18K			
R3	33K			
R4	1000Ω			
R5	4700Ω			
R6	1000Ω			
R7	1000Ω			
R8	1000Ω			
R9	150K			

ITEM No.	RATING		ROLAND PART No.	NOTES
	OHMS	WATT		
R10	10K			
R11	4700Ω			
R12	27K			
R13	1000Ω			
R14	560Ω			
R15	4700Ω			Note 1
R16	82Ω			
R17	470Ω			

Note 1. Some versions may use 4300Ω in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		ROLAND PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	464022					
L2	Osc. Coil	455062					
L3	1st IF	450018					
L4	2nd IF	450019					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4.6	: 1	430400						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	700Ω	3-4Ω	430410	GH6 ①			TA-43 ①		TY-45X ①	① Use Original Channel Frame

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ROLAND PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	404014	4A07	

BATTERIES

ITEM No.	VOLTAGE	ROLAND PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			P6		226		M1600	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ROLAND PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N60	350004	1N60	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ROLAND PART No.	NOTES
M3	Tuning Cap.	590043	2 Section, (Ant. 5-139mmf, Osc. 14-92mmf)

CABINETS & CABINET PARTS

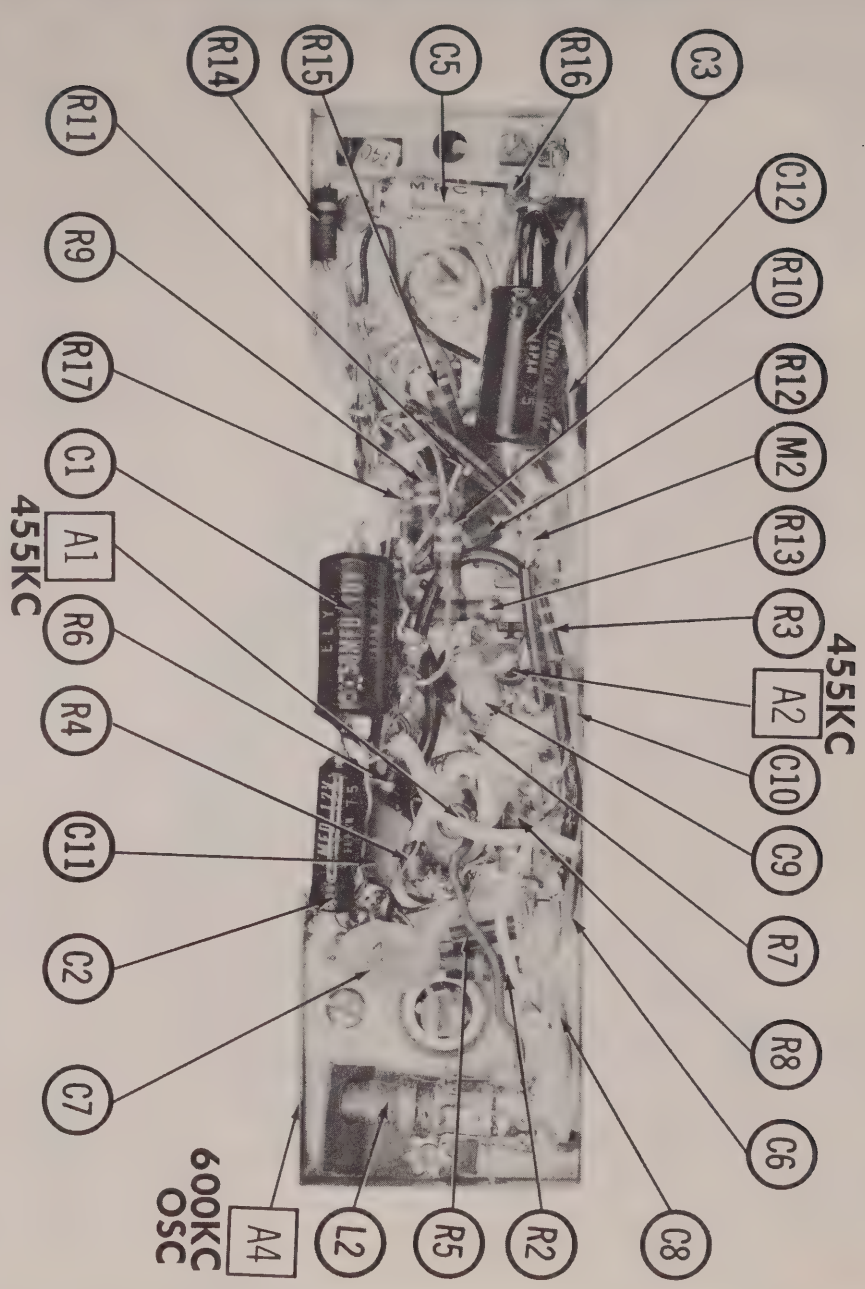
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

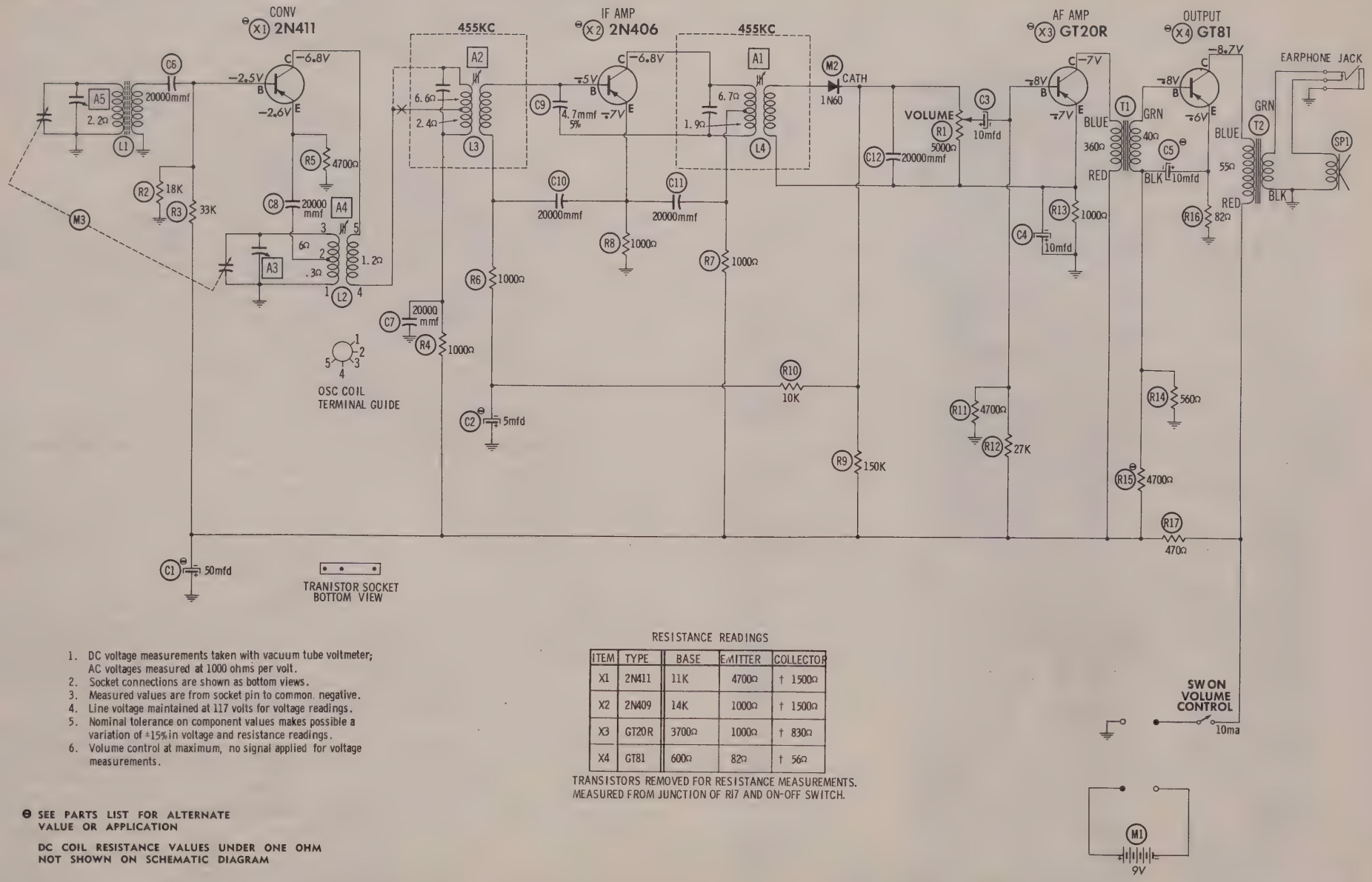
NAME	PART NO.	DESCRIPTION
Knob	272204	Tuning, Calibrated
Knob	272203	On-Off- Volume
Cabinet	250130	Front
Cabinet	250131	Back

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common, negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2N411	11K	4700Ω	† 1500Ω
X2	2N409	14K	1000Ω	† 1500Ω
X3	GT20R	3700Ω	1000Ω	† 830Ω
X4	GT81	600Ω	82Ω	† 56Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
MEASURED FROM JUNCTION OF R17 AND ON-OFF SWITCH.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ROLAND MODEL 4TR

PHOTOFACT* Folder

with CIRCUITRACE*

SILVERTONE MODELS 9021, 9022, 9023, 90235 (Ch. 528.53300)

SILVERTONE MODELS 9021, 9022, 9023, 90235 (Ch. 528.53300)

MODEL 9022

TRADE NAME	Silvertone Models 9021, 9022, 9023, 90235 (Ch. 528.53300)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	AC Operated AM Receiver With Electric Clock
TUBES	Five
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING 25 Watts, .28 Amp. @ 117 Volts AC (Less Clock)
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

Suggested alignment tools:
A1, A2, A3, A4 ..... General Cement #5097, Walsco #2515
A5, A7 ..... General Cement #8290, 8607, 8276, 5004, 5008, Walsco #2515, 2520, 2522, 2523, 2537
A6 ..... General Cement #8606, 8606L, Walsco #2543, 2544

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.	"	"	600KC	600KC	"	A6	Adjust for maximum output while rocking tuning gang. Repeat steps 2 and 3.
4.		Loop	1400KC	Tune to 1400KC signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver Adjust for maximum output.

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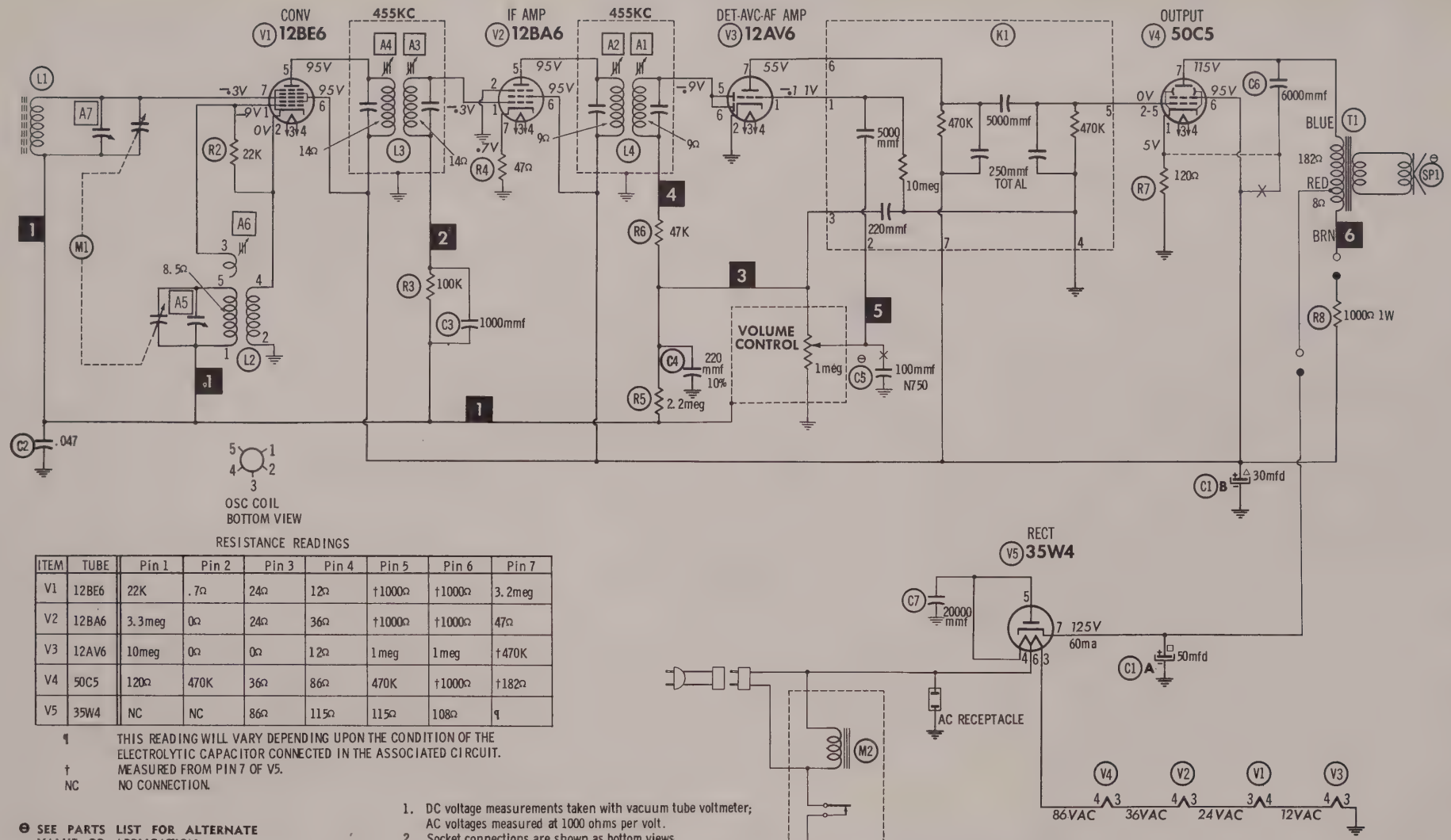
SET 429 FOLDER 13



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.7Ω	24Ω	12Ω	†1000Ω	†1000Ω	3.2meg
V2	12BA6	3.3meg	0Ω	24Ω	36Ω	†1000Ω	†1000Ω	47Ω
V3	12AV6	10meg	0Ω	0Ω	12Ω	1meg	1meg	†470K
V4	50C5	120Ω	470K	36Ω	86Ω	470K	†1000Ω	†182Ω
V5	35W4	NC	NC	86Ω	115Ω	115Ω	108Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 7 OF V5.

NC NO CONNECTION.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

THROUGH CAMS & LINKAGES ONE SWITCH PERFORMS ALL FUNCTIONS OF ON-OFF-AUTO & SLEEP.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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SILVERTONE MODELS 9021, 9022, 9023, 90235 (Ch. 528.53300)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■50	150	18-49-5	AFH2-17-50	BBRD5315	PFP213.1	TDLD-8	MTD-301	PCL-2432
B	▲30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	200	16-47328	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C3	1000		15-10217	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C4	220		15-22111	BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	10%
C5	100		15-10116	N750-DI 100	DTN-100	C10T1U	NT-531	5TCU-T1	N750①
C6	6000		20-85-0		DD-602	CUB6D6	B-260	6TM-D6	
C7	20000		15-20317	BPD-02	DD-203	BYB6S2		5HK-S2	

① Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	24-307-0		A47-1meg-Z	Q13-137	U53	Volume
B	Shaft				RS-3/16 †	NQ †	DS-37 †	† File or saw groove for retainer clip.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R2	22K		60-22301	
R3	100K		60-10401	
R4	47Ω		60-47001	
R5	2.2meg		60-22501	
R6	47K		60-47301	
R7	120Ω		60-12101	
R8	1000Ω	1	60-10211	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		SILVERTONE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Stick						
L2	Osc. Coil	10-30-4					
L3	Input IF	10-73-2	16-6780	BC-356	13-PC9	RF-4	
L4	Output IF	10-72-2	16-6780	BC-357	13-PC10	RF-4	

PRINTED BOARD

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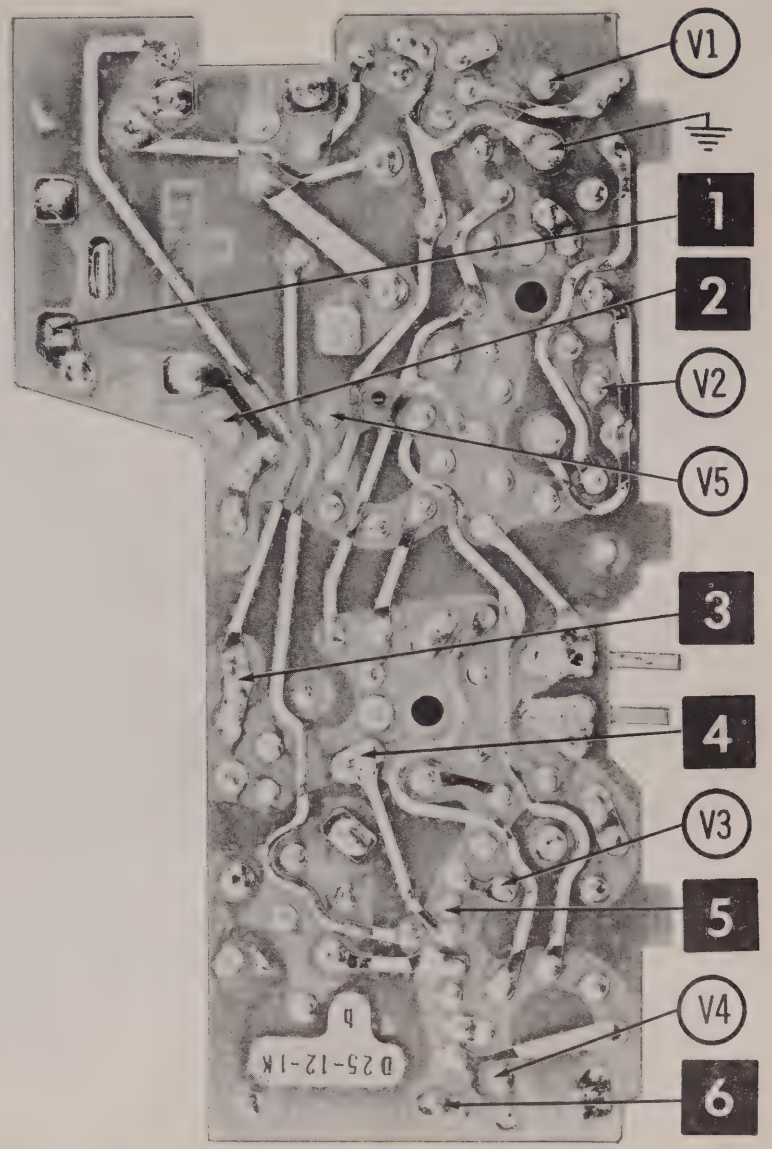
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



PARTS LIST AND DESCRIPTIONS (cont)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2400Ω tap ③ 200Ω	3-4Ω	80-36-1 ①							① Includes SP1

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA: SILVERTONE PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	33-327-4 ①	4A07	① Includes T1

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA
K1	Audio Coupling	5000mmf, 220mmf, 5000mmf, 250mmf, 10meg, 470K, 470K	13-14-3	

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M1	Tuning Cap.	19-69-2	2 Gang
M2	Clock	59-129	

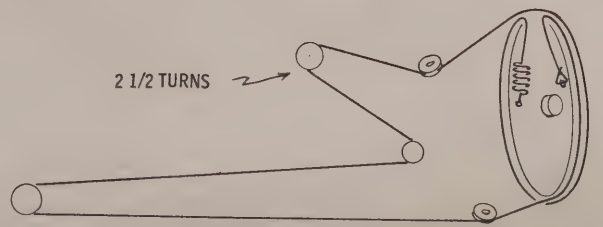
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	52-1054-0	Tuning
Knob	52-1056-0	Volume
Knob	52-1057-0	Clock (2 used)
Dial Scale	67-647-0	Includes trim strip
Pointer	52-56-1	
Cabinet	42-49-1	Ivory, Model 9022
Cabinet	42-48-1	Brown, Model 9021
Cabinet	42-50-1	Green, Model 9023
Cabinet	42-65-1	Pink, Model 90235
Window	48-153-1	Dial Scale
Window	48-152-1	Clock

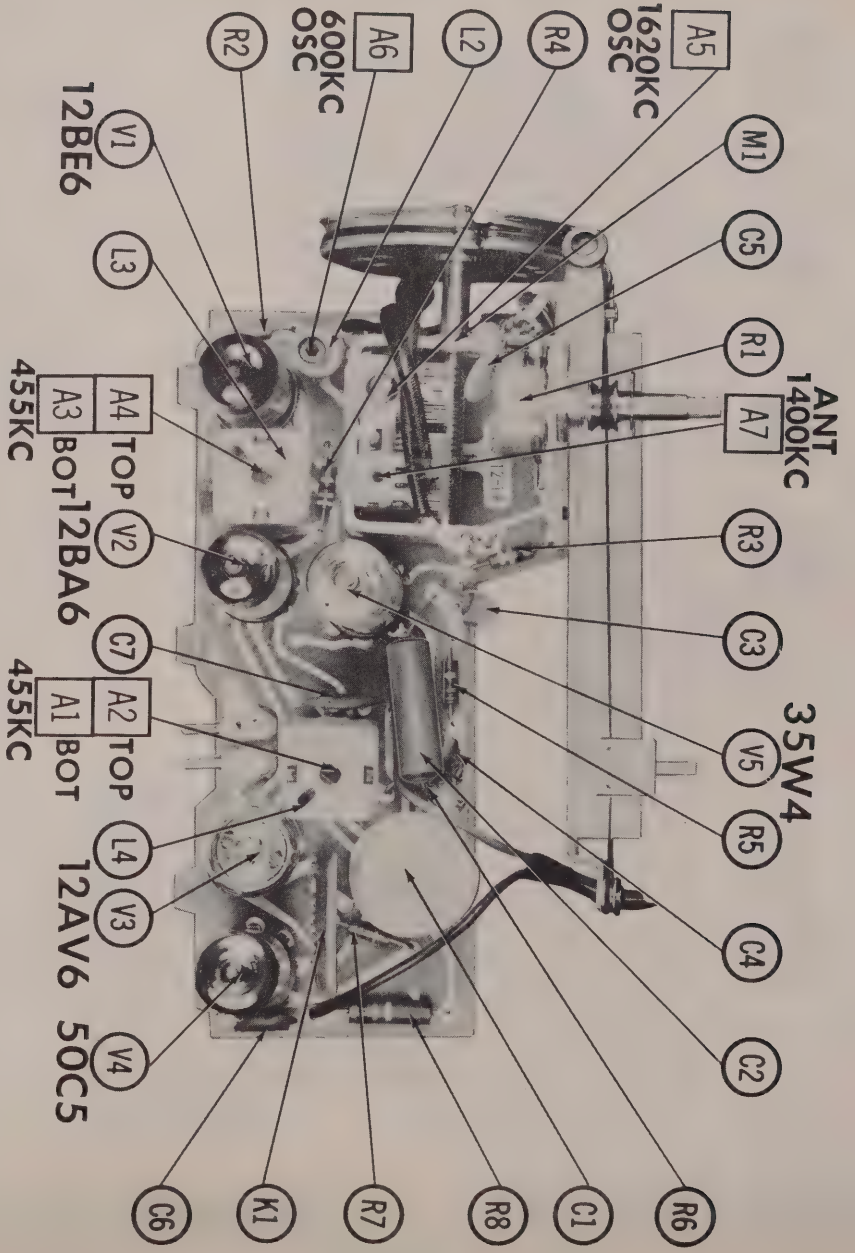
WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874



DIAL CORD STRINGING

CHASSIS—TOP VIEW



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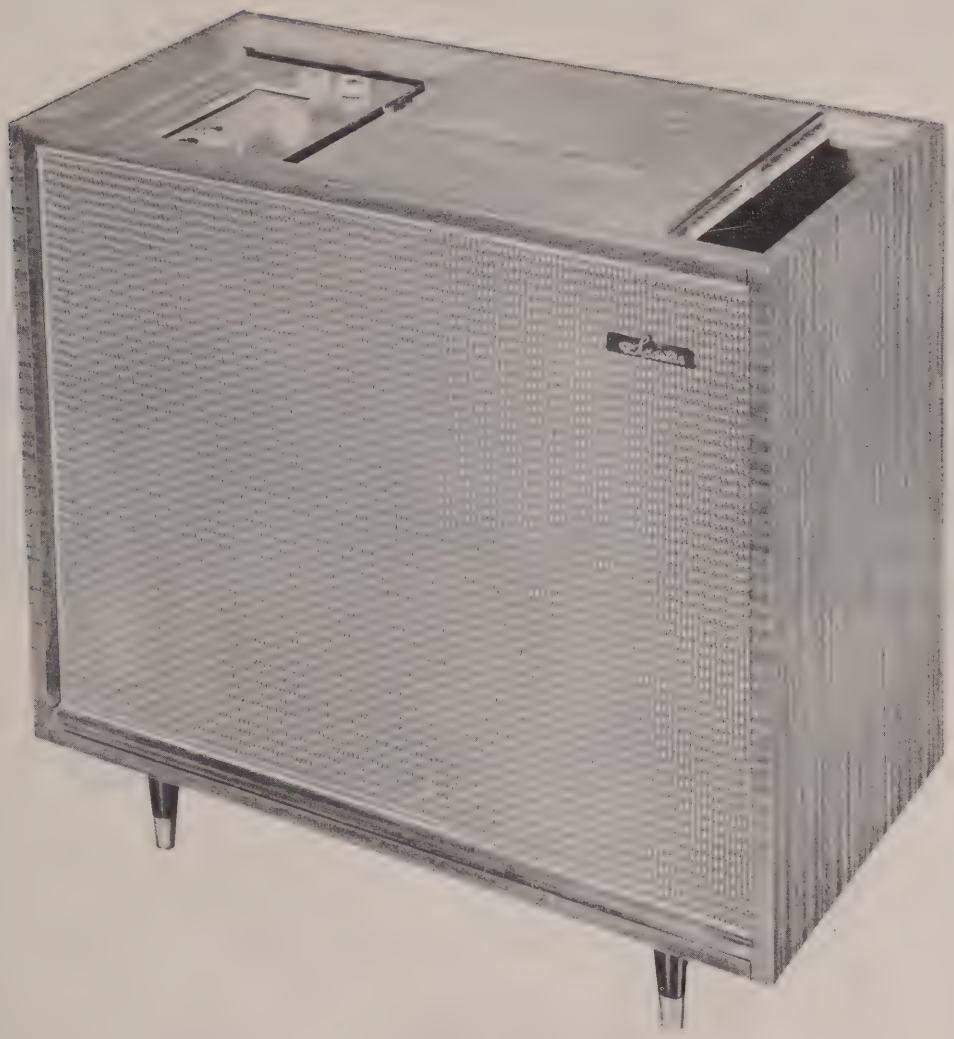
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

SPARTAN CHASSIS
AMP-143AA, BA, BB

SPARTAN CHASSIS
AMP-143AA, BA, BB



SPARTAN CHASSIS
AMP-143AA, BA, BB

TRADE NAME	Spartan Chassis AMP-143AA, AMP-143BA, AMP-143BB	
MANUFACTURER	Spartan Div., 2131 Bueter Road, Fort Wayne 4, Indiana	
TYPE SET	AC Operated Audio Amplifier	
TUBES	Four	
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 62 Watts, .63 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H780

SET 429 FOLDER 14

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp.-Phase Inv.	12AX7	
V2	Output	6V6GT	

ITEM No.	USE	TYPE	NOTES
V3	Output	6V6GT	
V4	Rectifier	5U4GA	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SPARTAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	450	270021-56	AFH4-78	D0640	FP429	TMQ-92	Q-380	TVL-4734
B	■30	450							
C	▲10	450							
D	20	25							
C2	20	25	270027-28	PRS50V20	BBR20-25	TT25X20	TD-25-25	MT-0220	TVA-1410

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SPARTAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	220		250218-5	SI 220	D6-221	LT6T22	UC-5322	5GA-T22	
C4	.001	600		P688N-001	D6-102	CUB6D1	GEM-621	6TM-D1	
C5	.047	200		P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C6	.047	400	250211-11	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C7	10000	1000	250219-2	DAC-27	DD-103	BYA10S1	B-110	10GAB-S1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

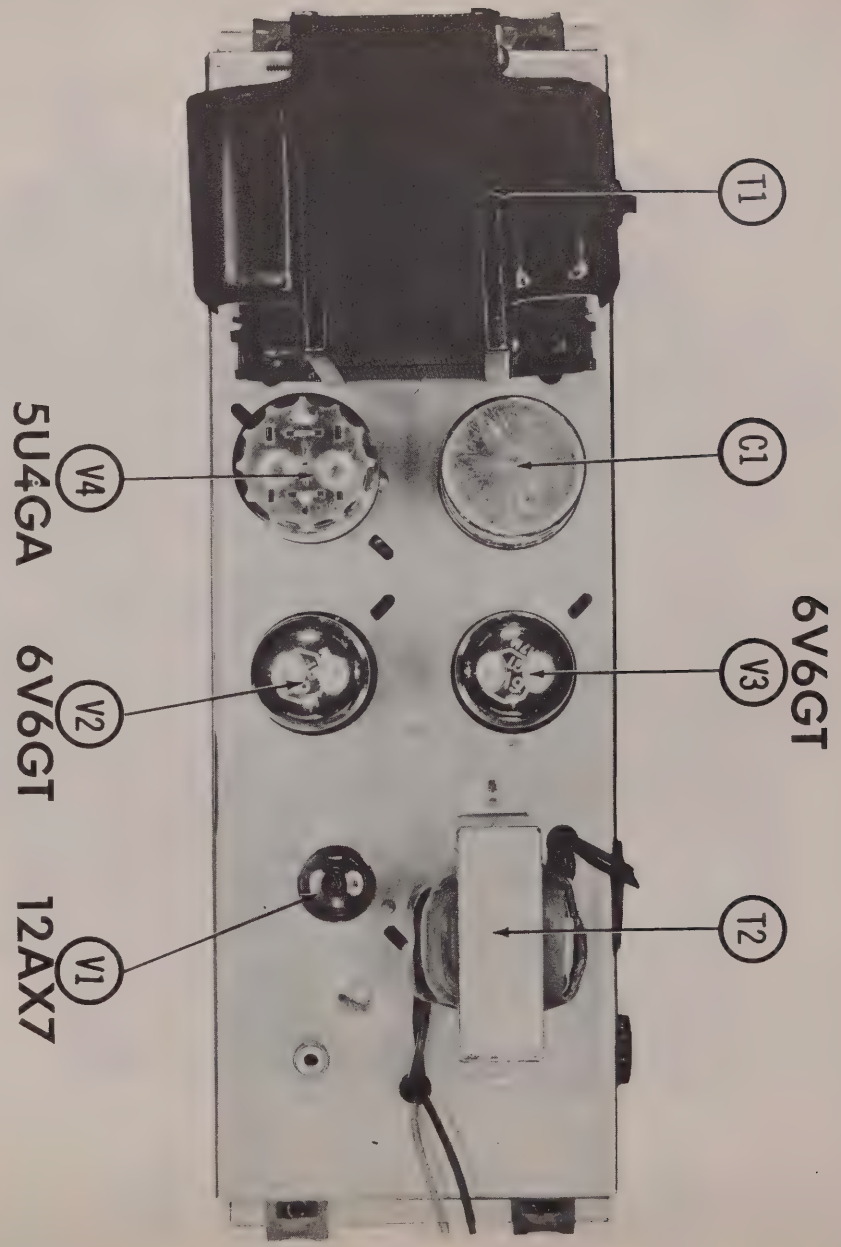
ITEM No.	RATING		SPARTAN PART No.	NOTES
	OHMS	WATT		
R1	470K		230104-94	
R2	47K		230104-82	
R3	470K		230104-94	
R4	3300Ω			
R5	220Ω			
R6	2700Ω			
R7	15K			
R8	470K		230104-94	

ITEM No.	RATING		SPARTAN PART No.	NOTES
	OHMS	WATT		
R9	6800Ω			
R10	220K			
R11	270Ω	2	230106-1055	
R12	220K			
R13	100K			
R14	100Ω		230104-50	
R15	100Ω		230104-50	

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ∿)	SPARTAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.080A	56Ω	1 Hy.	320041-2	C5040	C-2994		C-2327	26C41	C-24X

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
				SPARTAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
	PRI.	SEC. 1	SEC. 2							
T1	117V @ .63A	600VCT @ .080A	5V @ 1.8A	300080 ①	P9305	P-3052		PM8408	22R04	R-9B
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ 1.2A									

① Alternate Part #300078-2.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
			SPARTAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
	PRI.	SEC.								
T2	6800Ω CT	3-4Ω	330038-1	Z1011	A-2901 ①	AU-609	A-3870	22S58	S-53X	① Drill new mounting hole.

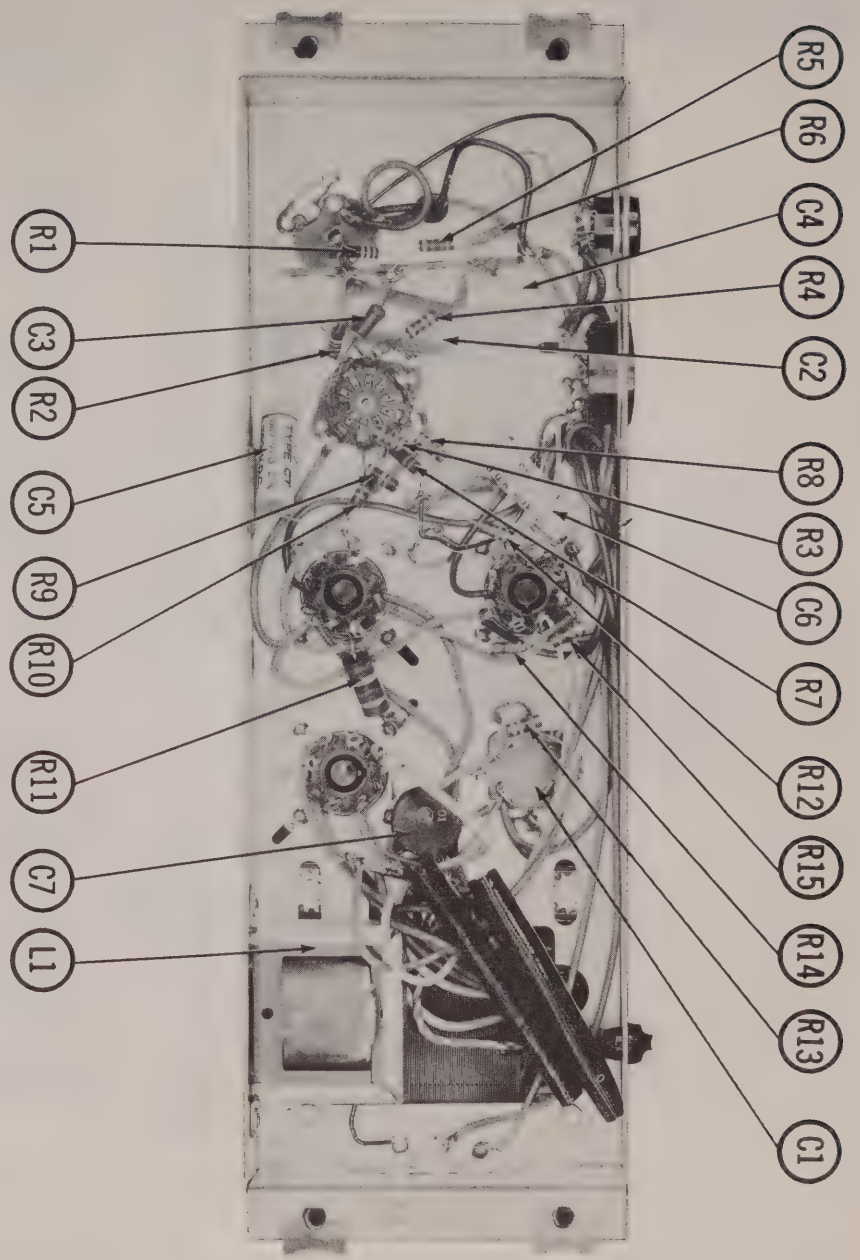
MISCELLANEOUS

ITEM No.	PART NAME	SPARTAN PART No.	NOTES
M1	Lamp		

WIRING DATA

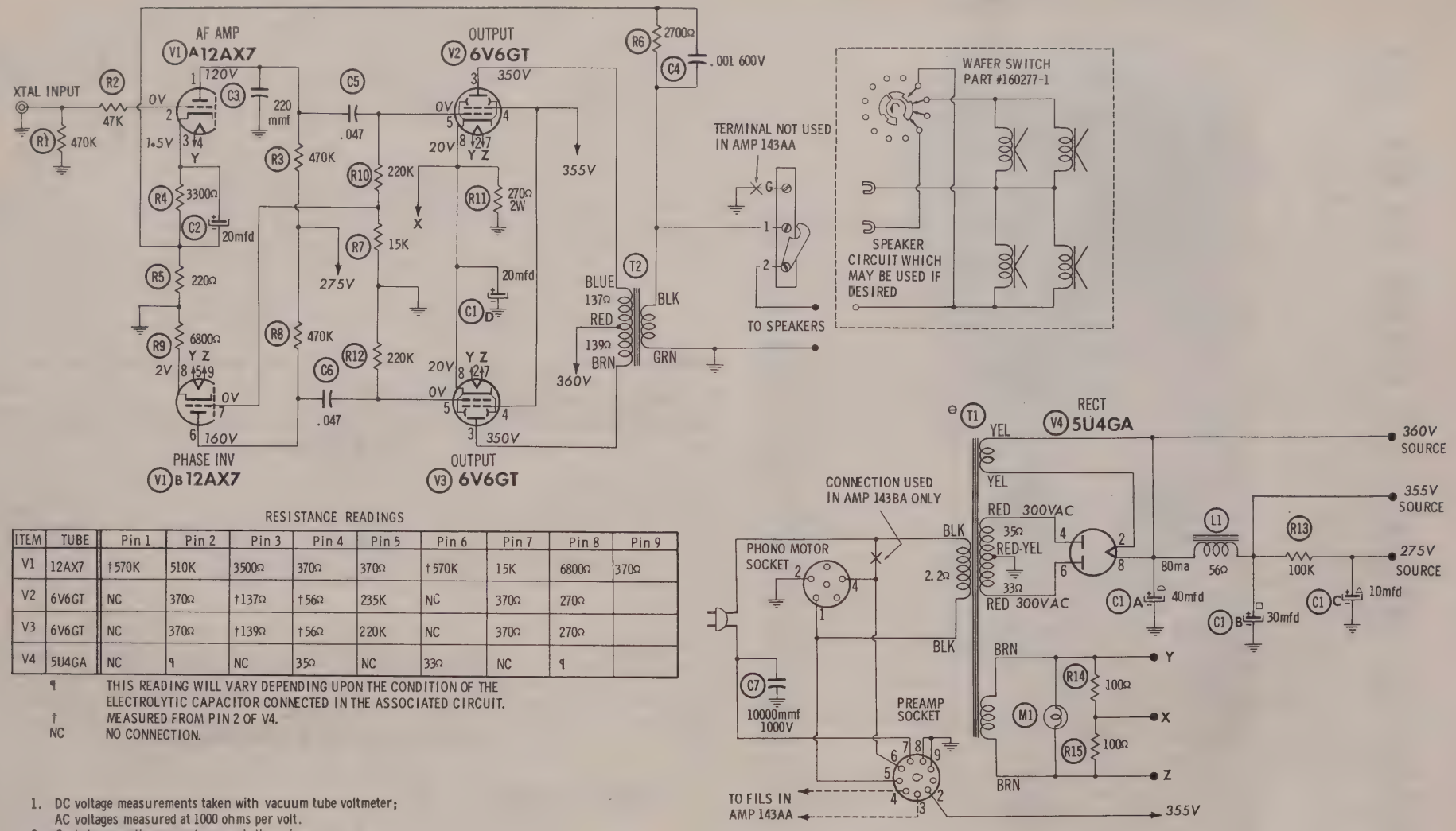
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW



SPARTAN CHASSIS
AMP-1432AA, BA, BB

FOLDER 14



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†570K	510K	3500Ω	370Ω	370Ω	†570K	15K	6800Ω	370Ω
V2	6V6GT	NC	370Ω	†137Ω	†56Ω	235K	NC	370Ω	270Ω	
V3	6V6GT	NC	370Ω	†139Ω	†56Ω	220K	NC	370Ω	270Ω	
V4	5U4GA	NC	¶	NC	35Ω	NC	33Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 2 OF V4.

NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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SPARTAN CHASSIS AMP-143AA, BA, BB

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STEELMAN MODELS 4AR10, 4AR10-1

STEELMAN MODELS
4AR10, 4AR10-1

MODEL 4AR10

TRADE NAME	Steelman Models 4AR10, 4AR10-1
MANUFACTURER	Steelman Phono & Radio Co., Inc., 2-30 Anderson Ave., Mount Vernon, N. Y.
TYPE SET	AC Operated AM Receiver With 4 Speed Automatic Record Changer
TUBES	Five
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	24 Watts, .25 Amp. @ 117 Volts AC (Less Motor)
TUNING RANGE—BROADCAST	535 - 1620KC

FOR SERVICE INFORMATION ON RECORD CHANGER USED IN MODEL 4AR10 - SEE V-M 959 - PHOTOFACT SET 396 FOLDER 13

FOR SERVICE INFORMATION ON RECORD CHANGER USED IN MODEL 4AR10-1 - SEE MONARCH UA8 - PHOTOFACT SET 381 FOLDER 11

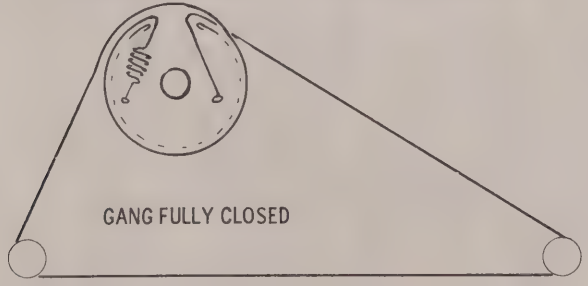
ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to antenna stator lug of tuning gang. Low side to B-	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.	"	"	1600KC	1600KC	"	A3	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H779

SET 429 FOLDER 15

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. - AVC - AF Amp.	12AV6	Note 1

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

Note 1. Some versions may use 12AT6 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	583018	PRS150V8040 20	BBRT84215	TCT3117	TDLT-7	FMT-339	TVA-3455
B	80	150							
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C3	50			NPO-SI 50	TCZ-50		ZT-545	5TCC-Q5	10% Note 1
C4	270			SI 270	D6-271	LT6T27	UC-5327	5GA-T47	Note 2
C5	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C6	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C7	.01	600		P688N-01	D6-103	CUB6SI	GEM-611	6TM-SI	
C8	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

Note 1. Not used in some versions. Note 2. Some versions may use 220mmf in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA STEELMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	360081	B-70	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	
R2A	100K	½	360050	B-41	A47-100K-Z	Q13-128	U39	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	STEELMAN PART No.	NOTES
R4	2.2meg			
R5	4700Ω			
R6	68K			

ITEM No.	RATING OHMS	RATING WATT	STEELMAN PART No.	NOTES
R7	150Ω			
R8	2200Ω	1		
R9	330Ω	1		

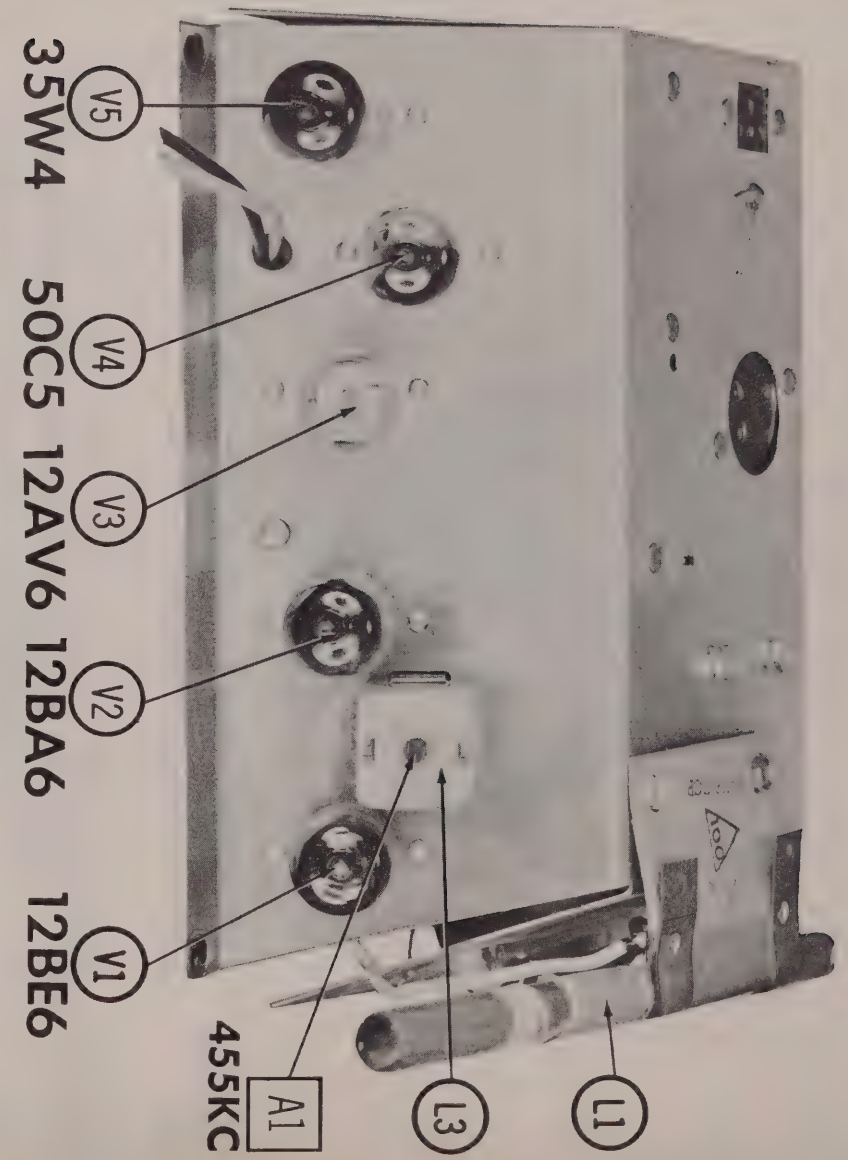
COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA STEELMAN PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	464016		BC-393*			*Drill larger mtg. hole.
L2	Osc. Coil	455056					① Alternate Part #450001.
L3	IF Trans.	450009 ①					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA STEELMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2600Ω	3-4Ω	TR-120 ①	Z1101	A-3025	AU-605	A-3332	24S53	S-12X	① Alternate Part #430202

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	STEELMAN PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	405005	5A15	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	STEELMAN PART No.	REPLACEMENT DATA
K1	Audio Circuit	220mmf, 250mmf, 250mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg	420006	Aerovox PA-113-2 Centralab PC-151 Cornell-Dubilier 116TM2 Sprague DT-2

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	STEELMAN PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	322517	118-TS	N8-1 & N8-3			Model 4AR10

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	STEELMAN PART No.	JENSEN PART No.	WALCO PART No.	
M2	329307 (78)	†CRA-55 or ♦CRA-55D	†W-64S or ♦W-64D	† Jewel ♦ Diamond
	329107 (LP)	†CRA-55LP or ♦CRA-55LPD	†W-64MGS or ♦W-64MGD	

MISCELLANEOUS

ITEM No.	PART NAME	STEELMAN PART No.	NOTES
M3	Tuning Cap.	590025	2 Gang (Ant. 28-490mmf, Osc. 16-170mmf)
M4	Switch	370002	Radio-Phono (DPDT, Slide Type)

CABINETS & CABINET PARTS

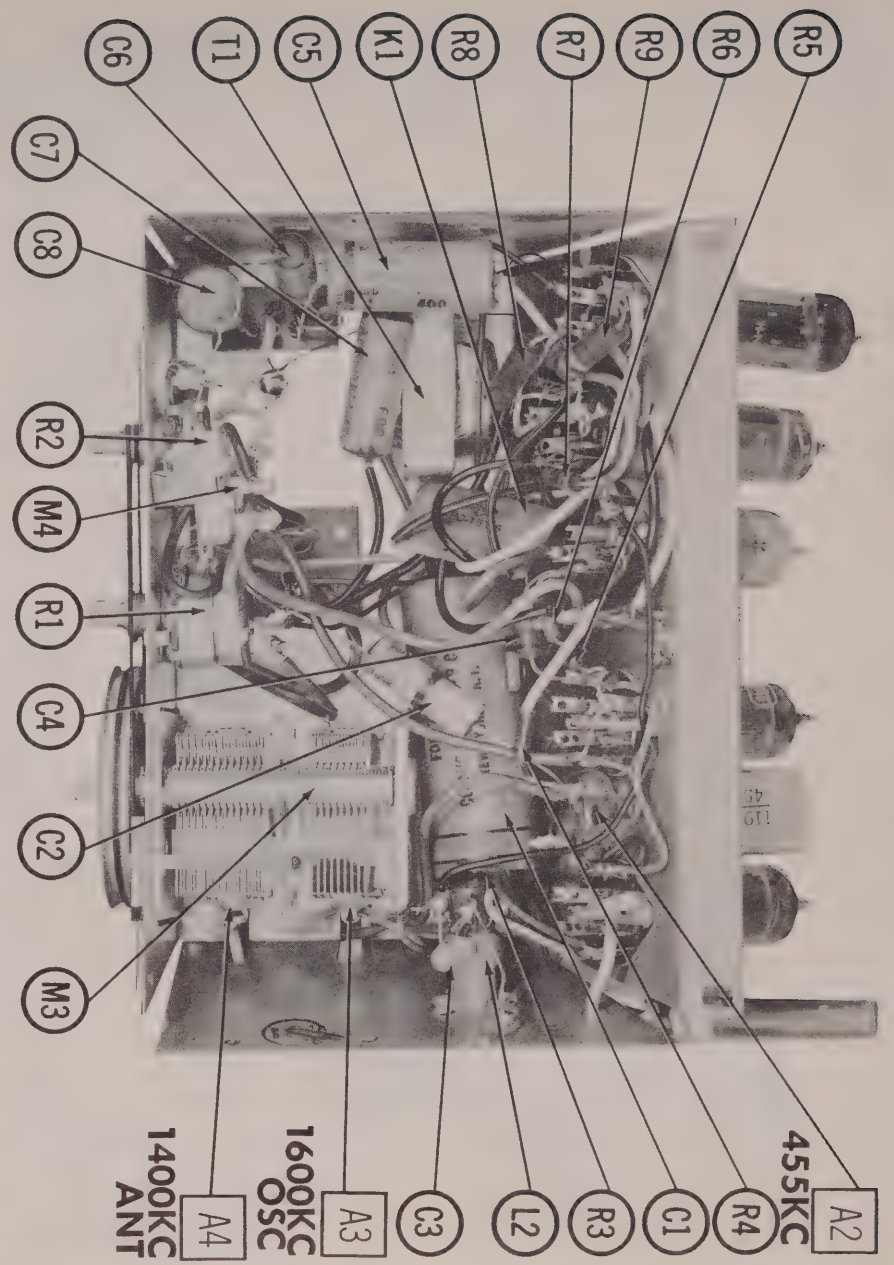
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

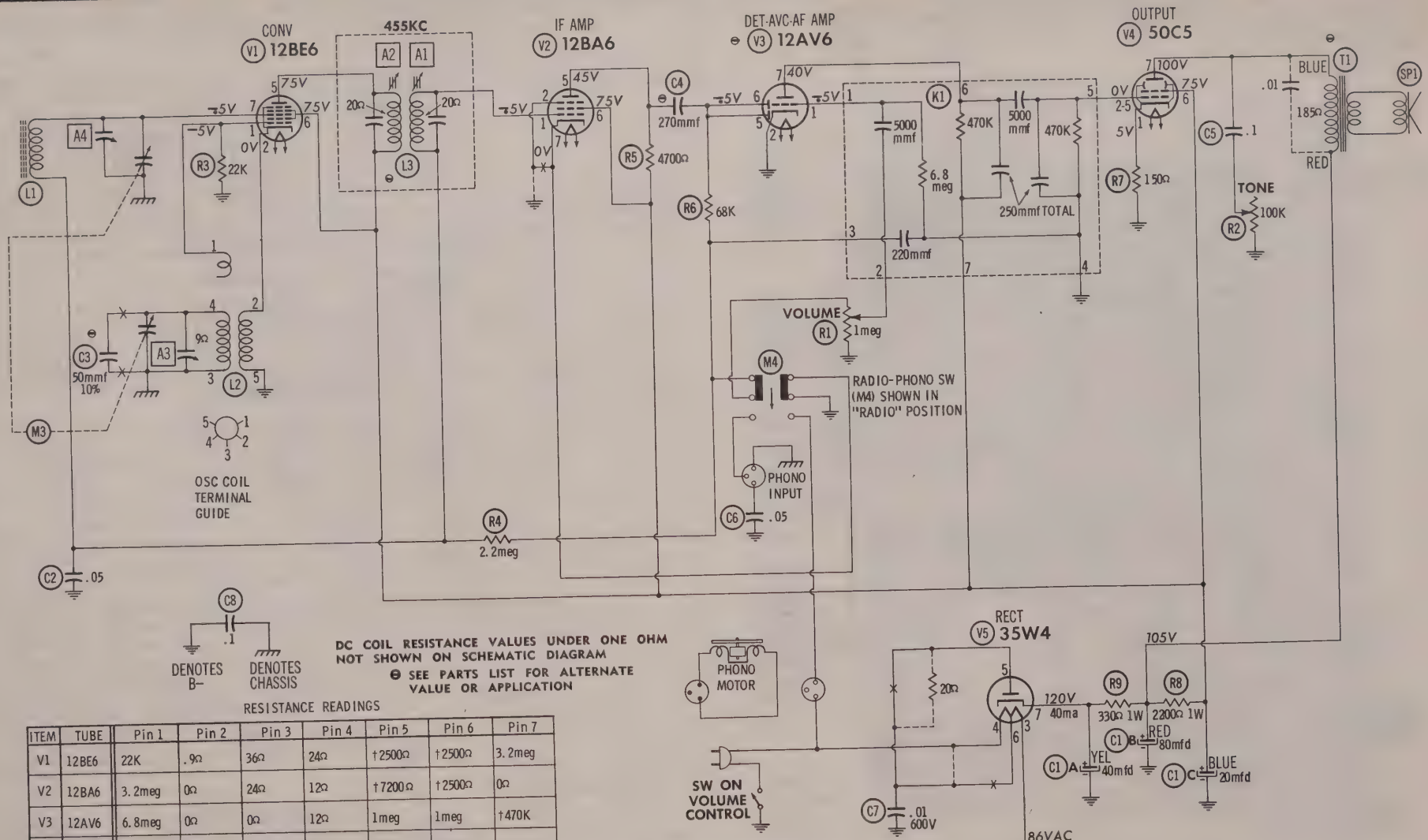
NAME	PART NO.	DESCRIPTION
Knob	270427	Tuning
Knob	270425	Loudness-Off-On
Knob	270426	Tone
Case	231110	
Dial Pointer	674029	

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.9Ω	36Ω	24Ω	†2500Ω	†2500Ω	3.2meg
V2	12BA6	3.2meg	0Ω	24Ω	12Ω	†7200Ω	†2500Ω	0Ω
V3	12AV6	6.8meg	0Ω	0Ω	12Ω	1meg	1meg	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	†2500Ω	†515Ω
V5	35W4	TP	TP	86Ω	110Ω	100Ω	100Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 7 OF V5.

TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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STEELMAN MODELS 4AR10, 4AR10-1

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

WESTINGHOUSE MODELS H-649T7, H-650T7 (Ch. V-2392)

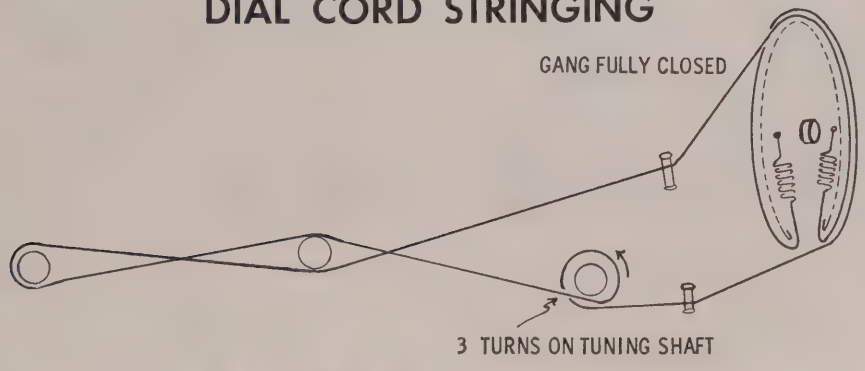
WESTINGHOUSE MODELS
H-649T7, H-650T7 (Ch. V-2392)

MODEL H-649T7

WESTINGHOUSE MODELS
H-649T7, H-650T7 (Ch. V-2392)

TRADE NAME	Westinghouse Models H-649T7, H-650T7 (Ch. V-2392)		
MANUFACTURER	Westinghouse Electric Corp., TV-Radio Div., Metuchen, N. J.		
TYPE SET	AC-DC Operated FM-AM Receiver		
TUBES	Seven		
POWER SUPPLY	105-120 Volts AC-DC	RATING	31 Watts, .34 Amp. @ 117 Volts AC
TUNING RANGE	BROADCAST 540 - 1600KC	FREQ. MOD.	88 - 108MC

DIAL CORD STRINGING



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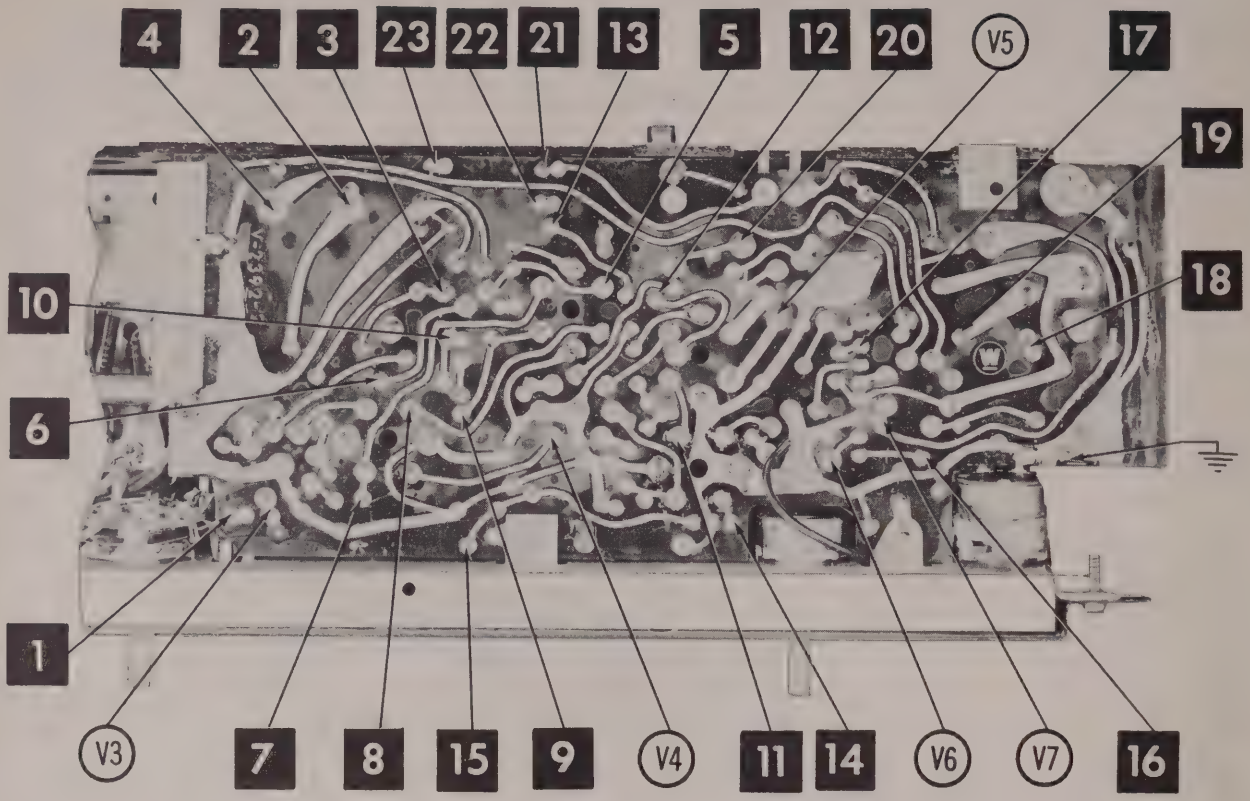
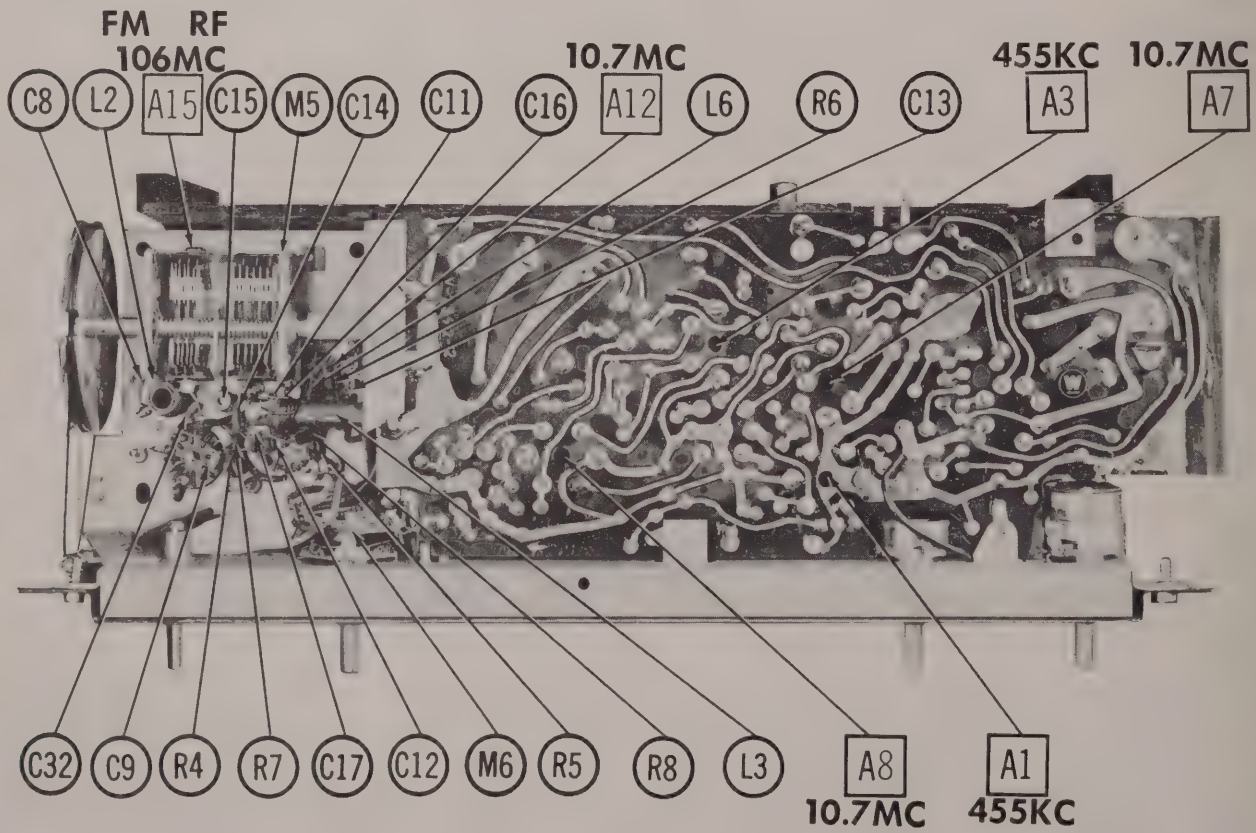
SET 429 FOLDER 16



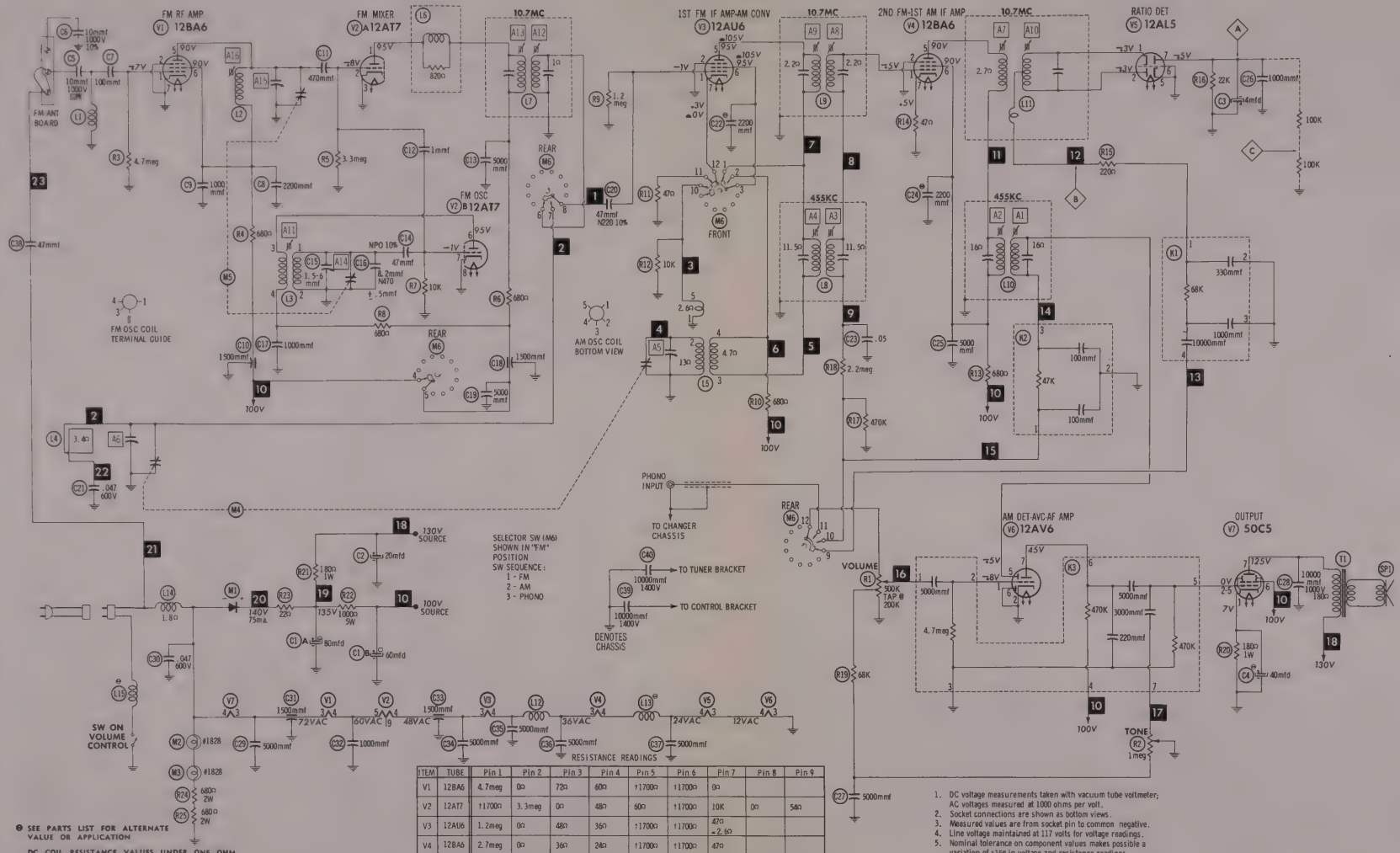
A Howard W. Sams CIRCUITRACE* Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



CHASSIS BOTTOM VIEW



ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BA6	4.7meg	0Ω	72Ω	60Ω	†1700Ω	†1700Ω	0Ω		
V2	12AT7	†1700Ω	3.3meg	0Ω	48Ω	60Ω	†1700Ω	10K	0Ω	54Ω
V3	12AU6	1.2meg	0Ω	48Ω	36Ω	†1700Ω	†1700Ω	47Ω = 2.6Ω		
V4	12BA6	2.7meg	0Ω	36Ω	24Ω	†1700Ω	†1700Ω	47Ω		
V5	12AL5	INF	INF	12Ω	24Ω	0Ω	0Ω	22K		
V6	12AV6	4.7meg	0Ω	0Ω	12Ω	500K	0Ω	†470K		
V7	50C5	180Ω	470K	72Ω	110Ω	470K	†1000Ω	†380Ω		

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
= MEASURED IN "AM" POSITION
† MEASURED FROM OUTPUT OF M1

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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WESTINGHOUSE MODELS H-649T7, H-650T7 (Ch. V-2392)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna stator lug (rear section of tuning gang). Low side to B-.	455KC (400~ Mod.)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1625KC	"	"	"	A5	"
3.		Loop	1400KC	"	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100K (±1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	200mmf	High side to pin 1 (grid) of 12AU6 (V3). Low side to B-.	10.7MC (Unmod.)	FM	Point of non-interference	DC probe to point Ⓐ. Common to B-.	A7, A8, A9	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	200mmf	High side to pin 1 (grid) of 12AU6 (V3). Low side to B-.	10.7MC (450KC Swp.)	FM	Point of non-interference	Vert. Amp. to point Ⓐ. Low side to B-.	A7, A8, A9	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. Amp. to point Ⓑ. Low side to B-.	A10	Reconnect stabilizing capacitor C3. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

Disconnect Internal FM Antenna Link.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	270Ω Carbon Resistor	Across FM antenna terminals.	98MC (Unmod.)	FM	98MC	DC probe to point Ⓐ. Common to B-.	A11	Adjust for maximum deflection.
7.	"	"	"	"	"	"	A12, A13	"
8.	"	"	108.5MC	"	Tuning gang fully open	"	A14	"
9.	"	"	87.5MC	"	Tuning gang fully closed	"	A11	Adjust for maximum deflection. Repeat steps 8 and 9.
10.	"	"	106MC	"	Tune to 106MC signal	"	A15	Adjust for maximum deflection while rocking tuning gang.
11.	"	"	90MC	"	Tune to 90MC signal	"	A16	"

FIG. 1

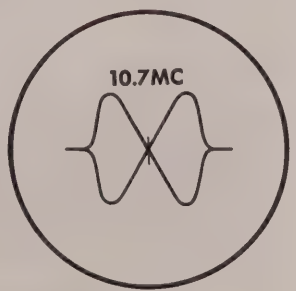
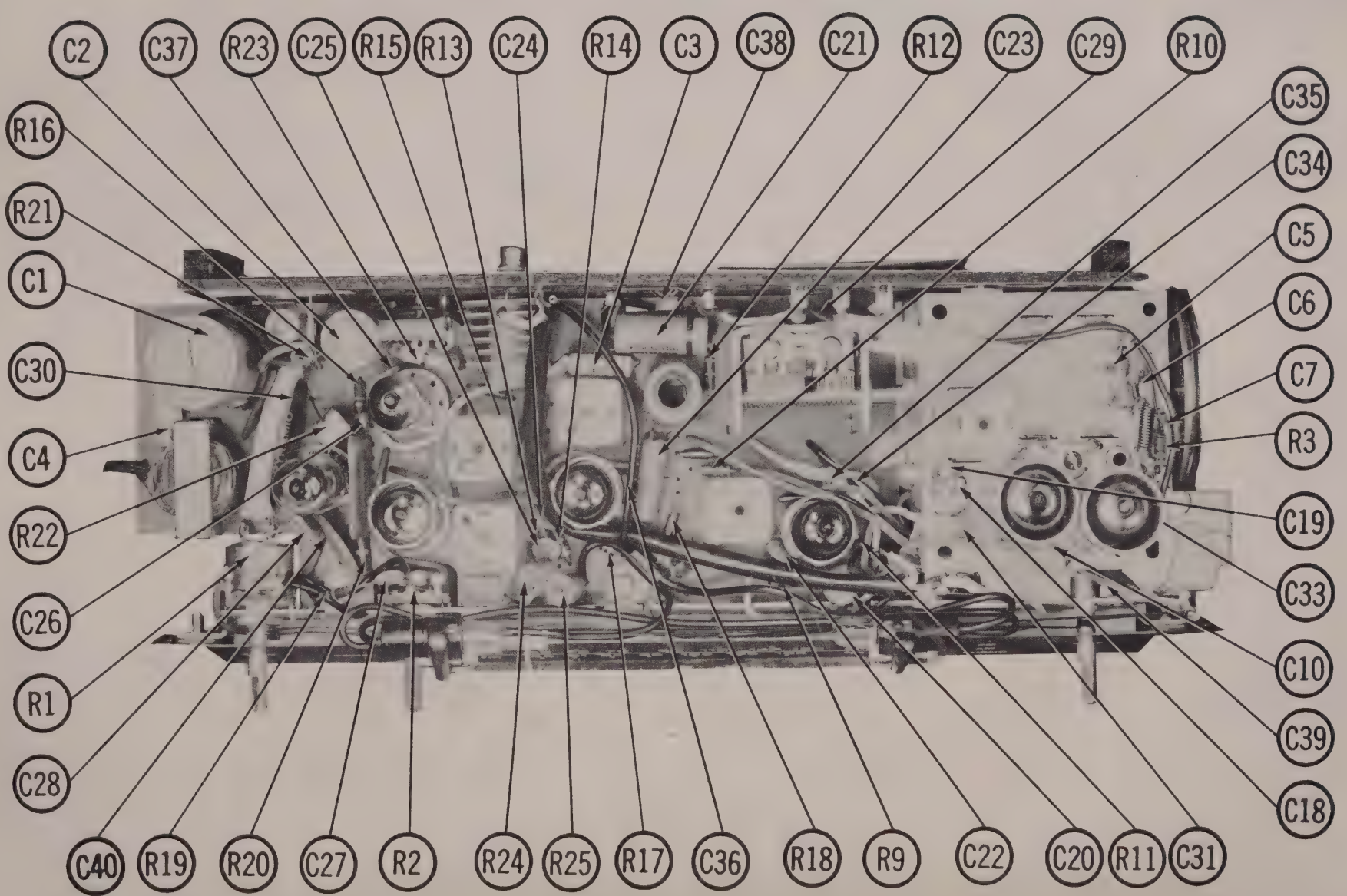


FIG. 2



CHASSIS TOP VIEW - CAPACITOR & RESISTOR IDENT.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amplifier	12BA6	
V2	FM Mixer - FM Osc.	12AT7	
V3	1st FM IF Amp.-AM Conv.	12AU6	
V4	2nd FM-1st AM IF Amp.	12BA6	

ITEM No.	USE	TYPE	NOTES
V5	Ratio Detector	12AL5	
V6	AM Det.-AVC-AF Amp.	12AV6	
V7	Output	50C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲80	150	218V033H01	PRS150/25V 8040/20	BBRQ55515C			FMT-333	R2726 *
B	■60	150							
C	▲20	25	①						
C2	20	175	218V022H01	PRS250V20	BR2025	TC55	TD-20-250	MT-2520	TVA-1508
C3	4	50	218V012H13	PWE50005	NL5-50	TT50X5	ML4-50		TE-1302.1
C4	40	10	②	PWE10040	NL50-10	TT15X40	ML40-15	MQ-0130	R2329 *

① C1C is not used. ② Some versions may use 40mfd ③ 25VDC (Part #218V012H01).
* Not normally in distributors stock. Available thru distributor on order to manufacturer.

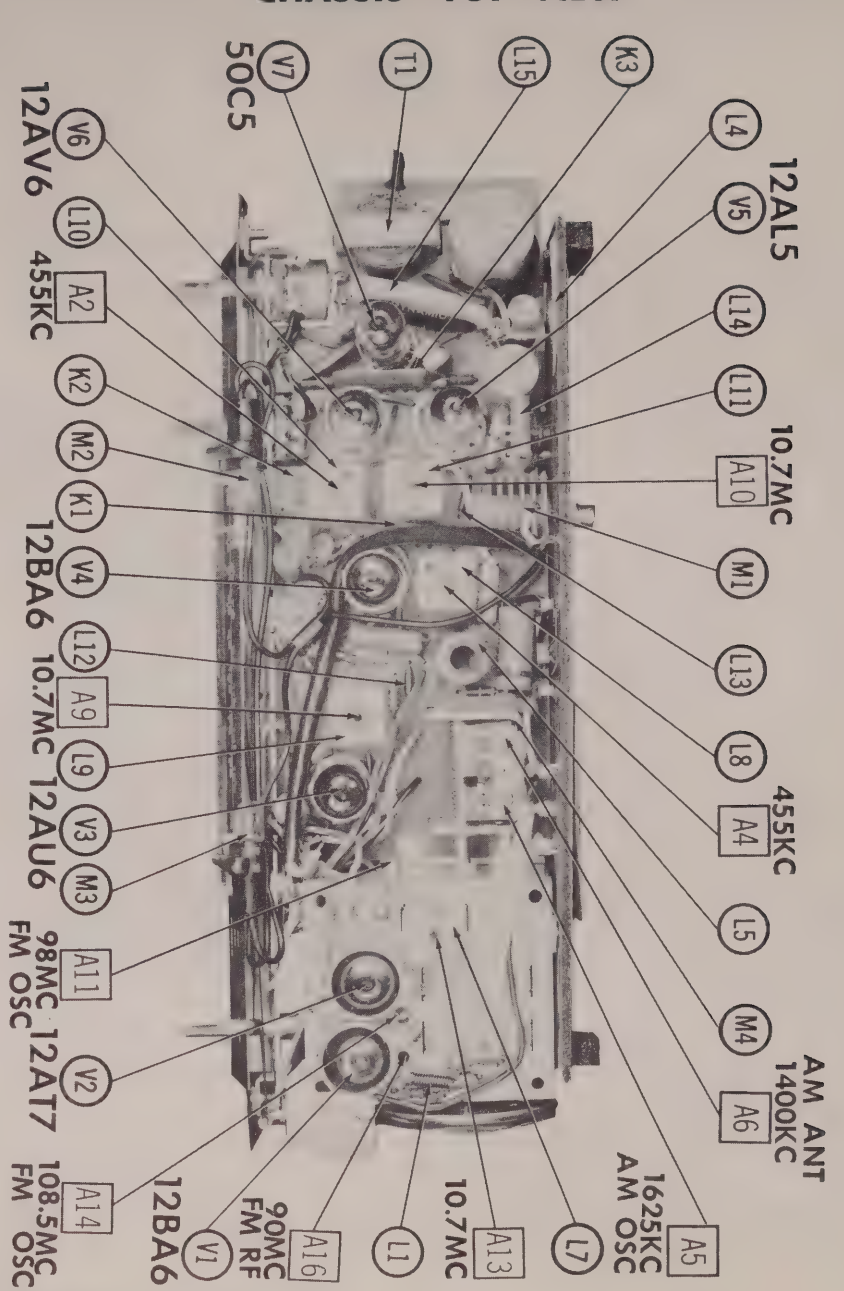
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	10	1000	213V182H01	1469-00001		22R5Q1	MCB415	MS-41	10%
C6	10	1000	213V182H01	1469-00001		22R5Q1	MCB415	MS-41	10%
C7	100		215V111A01	BPD-0001	DD-101	L10T1	UC-531	5GA-T1	
C8	2200		215V102A22	BPD-0022	DD-222	BYA10D22	UC-5222	5HK-D22	
C9	1000		215V308H02	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C10	1500		219V025H02						
C11	470		215V104A71	BPD-00047	DD-471	L10T47	UC-5347	5GA-T47	
C12	1		217V011A09	NPO-SI 1	TCZ-1			5TCCB-V1	
C13	5000		215V308H04	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C14	47		215V300H45	NPO-DI 47	DTZ-47	C10Q47C		5TCC-Q47	NPO 10%
C15	1.5-6		215V307H01						N470 ±.5mmf
C16	8.2		215V300H46						
C17	1000		215V308H02	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C18	1500		219V025H02						
C19	5000		215V308H04	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C20	47		215V014A70						N220 10%
C21	.047	600	210V111H06	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C22	2200		215V102A22	BPD-0022	DD-222	BYA10D22	UC-5222	5HK-D22	①
C23	.05	200	210V111H05	P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	①
C24	2200		215V102A22	BPD-0022	DD-222	BYA10D22	UC-5222	5HK-D22	①
C25	5000		215V308H04	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C26	1000		215V308H02	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C27	5000		215V308H04	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C28	10000	1000	215V300H03	DAC-27	DD16-103	HVE16S1		20HKB-S1	
C29	5000		215V308H04	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C30	.047	600	210V214A73	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C31	1500		219V025H02						
C32	1000		215V308H02	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C33	1500		219V025H02						
C34	5000		215V308H04	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C35	5000		215V308H04	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C36	5000		215V308H04	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C37	5000		215V308H04	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C38	47		213V182H02	1468-000047	DD-470	5W5Q47		1FM-447	
C39	10000	1400	215V306H03	DAC-27	DD16-103	HVE16S1		20HKB-S1	
C40	10000	1400	215V306H02	DAC-27	DD16-103	HVE16S1		20HKB-S1	

① Some versions may use 2000mmf in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	270V039H01				PP55T25	Volume, Tap ② 200K
B	Switch						Not Req.	
R2A	1meg	½	270V039H07	B-69	A47-1meg-S	Q11-137	U54	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Westinghouse PART No.	NOTES
	OHMS	WATT		
R3	4.7meg		250V234A75	
R4	680Ω		250V226A81	
R5	3.3meg		250V223A35	
R6	680Ω		250V226A81	
R7	10K		250V221A03	
R8	680Ω		250V226A81	
R9	1.2meg		250V221A25	
R10	680Ω		250V226A81	
R11	47Ω		250V224A70	
R12	10K		250V231A03	
R13	680Ω		250V226A81	
R14	47Ω		250V224A70	

ITEM No.	RATING		Westinghouse PART No.	NOTES
	OHMS	WATT		
R15	220Ω		250V222A21	
R16	22K		250V222A23	
R17	470K		250V214A74	
R18	2.2meg		250V222A25	
R19	68K		250V226A83	
R20	180Ω	1	250V321A81	
R21	180Ω	1	250V321A81	
R22	1000Ω	5	251V020H15	
R23	22Ω		251V023H20	
R24	680Ω	2	250V436A81	
R25	680Ω	2	250V436A81	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Westinghouse PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Ant. Coil	230V065H01					
L2	FM RF Coil	230V045H01					
L3	FM Osc. Coil	230V045H02					
L4	Loop Ant.	787V087H01					
L5	AM Osc. Coil	230V044H01					
L6	RF Choke	230V056H17					Wound on 820Ω
L7	1st FM IF	235V039H01					
L8	1st AM IF	235V044H01					
L9	2nd FM IF	235V037H02					
L10	2nd AM IF	235V038H02					
L11	Ratio Detector	235V035H01					
L12	Fil. Choke	230V056H02					1.1 Microhenries
L13	Fil. Choke	230V056H02					1.1 Microhenries
L14	Line Choke	V-9099-5					2.7 Microhenries ②
L15	Line Choke	①					1.2 Microhenries ②

① Some versions may use Part #V-9099-5 (2.7 Microhenries). ② IRC Part #CLA.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2700Ω	3-4Ω	430V051H01	Z1101 ①	A-3025①	AU-605 ①	A-3332 ①	24S53 ①	S-12X ①	① Use original frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	2½" x 10"	PM	3-4Ω	570V024H01		

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Westinghouse PART No.	REPLACEMENT DATA
K1	Audio-FM Det. Net.	330mmf, 1000mmf, 10000mmf, 68K	219V020H01	
K2	Diode Filter	100mmf, 100mmf, 47K	219V022H01	Aerovox PA-97 Centralab PC-50 Cornell-Dubilier 111TM1 Sprague D-1
K3	Audio Circuit	220mmf, 3000mmf, 5000mmf, 5000mmf, 470K, 470K, 4.7meg	219V019H01	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	Westinghouse PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.073A	295V012H01	1235AH	T100	100AV	

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M2	Lamp	756V501H07	#1828
M3	Lamp	756V501H07	#1828
M4	Tuning Cap.	330V015H04	2 Section, AM
M5	Tuning Cap.	330V016H01	2 Section, FM
M6	Switch	756V027H01	AM-FM-Phono, Rotary, Wafer Type

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	550V082H01	AM-FM Tuning, Volume-On-Off, Tone
Knob	550V082H02	AM-FM-Phono Selector
Cabinet	558V153H01	Front
Cabinet	513V017H13	Shell, Model H649T7
Cabinet	513V017H16	Shell, Model H650T7
Pointer	558V172H01	
Dial	558V118H01	Front
Dial	558V175H01	Scale, Background

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

WUMO
Dekamix

GENERAL INFORMATION

Wumo Dekamix record changers play a stack of records in automatic sequence and shut off after the last record.

The Wumo Dekamix plays in four speeds: 16 2/3, 33 1/3, 45, or 78 rpm. Up to 10 records may be played, and 10" and 12" records may be intermixed. However, 7" records must be placed on top.

Records are separated by the movement of a finger in the center spindle, which directly separates records having a 1/4" centerhole.

Connect this changer to an outlet supply 117 volts, 60 cycles AC only, unless otherwise specified.

Manufactured by:
Dekomix
West Germany

Supplied by:
Electronic Division
Ercona Corporation
16 West 46th Street
New York 36, N.Y.

This material compiled and published by

HOWARD W. SAMS & CO., INC., INDIANAPOLIS 6, INDIANA

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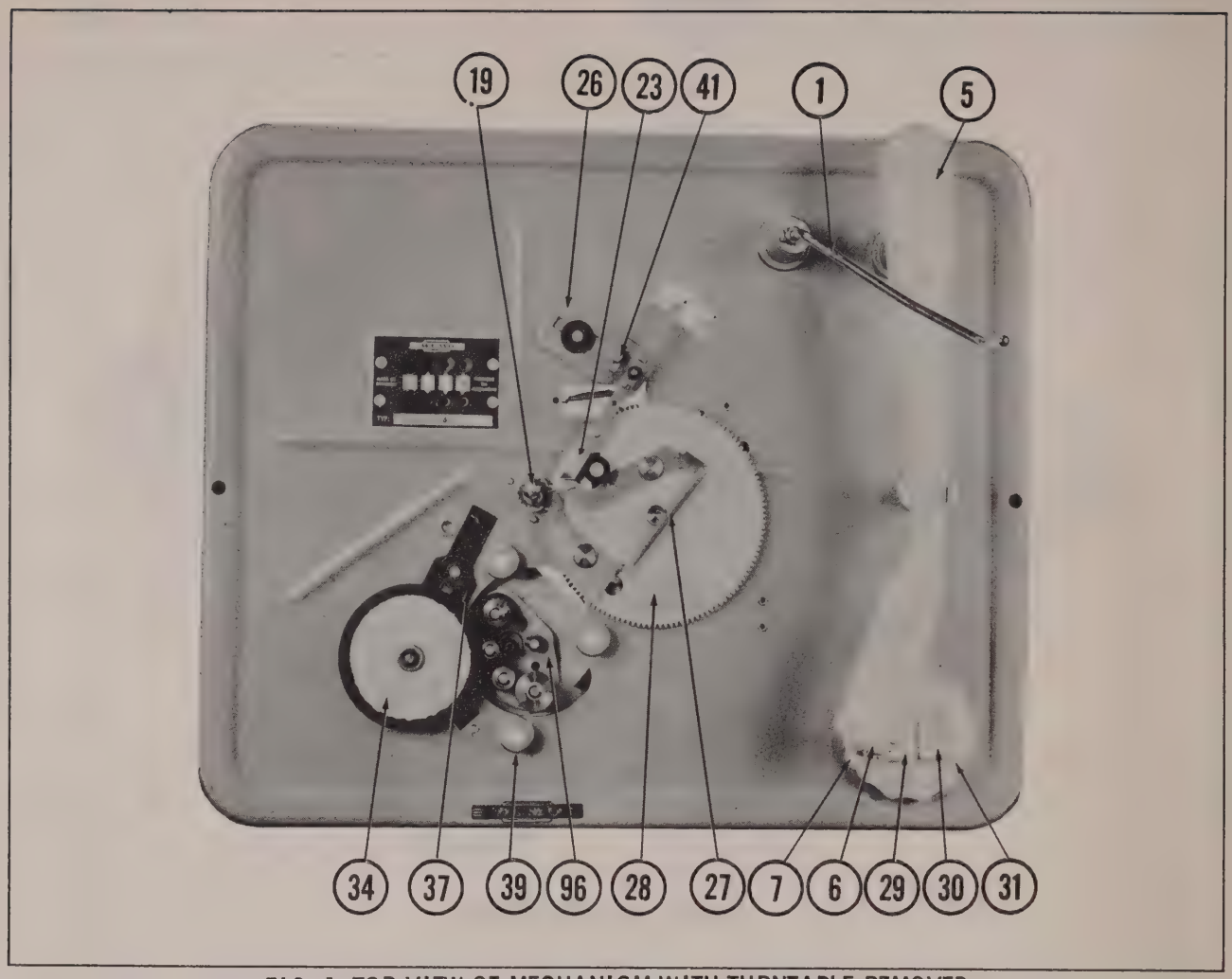


FIG. 1 TOP VIEW OF MECHANISM WITH TURNTABLE REMOVED

PREPARING FOR OPERATION

Leveling Record Changer

The record changer must be absolutely level. Use a torpedo or similar type level on the record changer baseplate and adequate shims to level the changer.

Function of Controls

All controls are located on the right front corner of the baseplate. They are:

1. Start button--is the right push button. Depressing it energizes the motor and starts the changer into automatic operation. The changer shuts off automatically after the last record has been played, but can be shut off manually by depressing the Stop button (see next paragraph).

2. Stop button--is the left push button. It shuts off power to the motor, stopping the record changer.

3. Speed control knob--has five positions: 16, 33, O, 45, and 78. The changer should be placed in the O position when the unit is not to be used for some time. In the O position, friction wheel (34) does not touch the driving surfaces of the motor.

OPERATING INSTRUCTIONS

Loading

1. Remove record hold-down disc (2) from spindle (19).

2. Place records on spindle (19) and lower to offset shelf. Hold records level and replace record hold-down disc (2) over spindle (19).

Starting

After making sure the needle and speed control knob are in the proper position for the type of records to be played, depress the Start button. The changer operates automatically until the last record has been played. Tone arm (5) is then returned to its rest, and the supply to the motor is switched off.

Rejecting

To reject a record at any time while the changer is operating, depress the Start button.

Unloading

Lift record hold-down disc (2) clear of spindle (19). Using both hands and with fingers under edge of bottom record, lift records off the spindle.

CHANGE CYCLE

Observe the change cycle operation by manually rotating the turntable. The following action can then be readily observed, and the function of each part can be more easily understood.

The automatic trip mechanism operates on the velocity trip principle; it operates only when the inward motion of tone arm (5) reaches the lead-out grooves at the end of a record.

Tone arm (5) and dragging lever (60) are so connected that they move together. As tone arm (5) nears the end of a record, dragging lever (60) pushes tilting lever (23). The point of tilting lever (23) touches bent spring (18), rotating with the turntable hub. If the point of tilting lever (23) approaches very slowly, bent spring (18) touches tilting lever (23) on its sloping edge only. Tilting lever (23) is thrust back according to the speed of approach.

When tone arm (5) enters the lead-out groove, tilting lever (23) moves rapidly toward the turntable hub. Bent spring (18) on the turntable hub seizes and turns tilting lever (23). Tilting lever (23) is forced to contact latch (28B), releasing control wheel coupling (28A). The teeth of control wheel coupling (28A) mesh with the turntable hub, causing control wheel (28) to rotate with the hub.

Cam disc (79) is connected to control wheel (28) by a shaft. As control wheel (28) begins to rotate, cam disc (79) is rotating with control wheel (28). Cam disc (79) controls two functions of tone arm (5): its vertical motion, by action of control rail (62); and its horizontal motion, by action of control lever (52) riding in cam disc (79). Tone arm (5) is lifted from the record by drawing bar (10) being forced down by control rail (62). About the same time tone arm (5) reaches its maximum height, control lever (52), riding in cam disc (79), moves forward, forcing stop lever (59) outward and tone arm (5) to its rest.

Almost simultaneously, record selector arm (1) approaches the record and touches its edge. Stop piece (71) is connected to the bottom of record selector arm (1) and is also stopped by the record. As tone arm (5) starts its inward movement, stop pin (59A) is stopped in its proper notch, depending on the size of record being played, by stop piece (71).

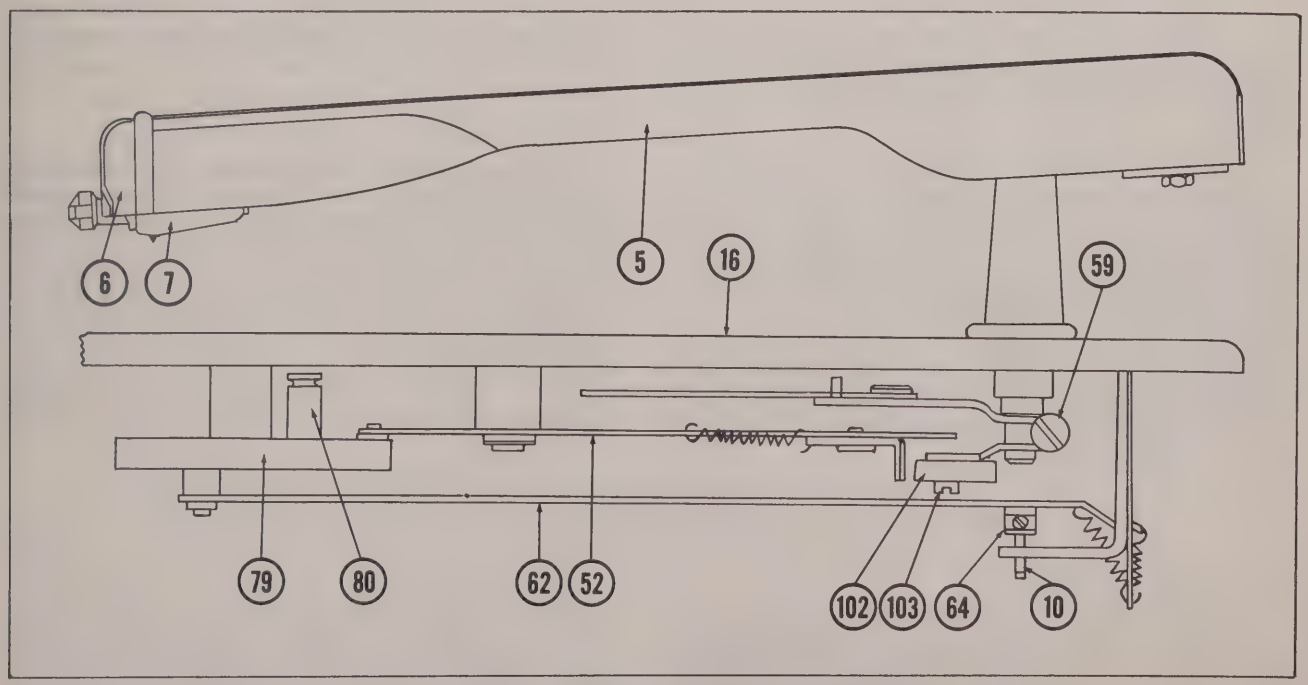


FIG. 2 SIDE VIEW DIAGRAM OF MECHANISM

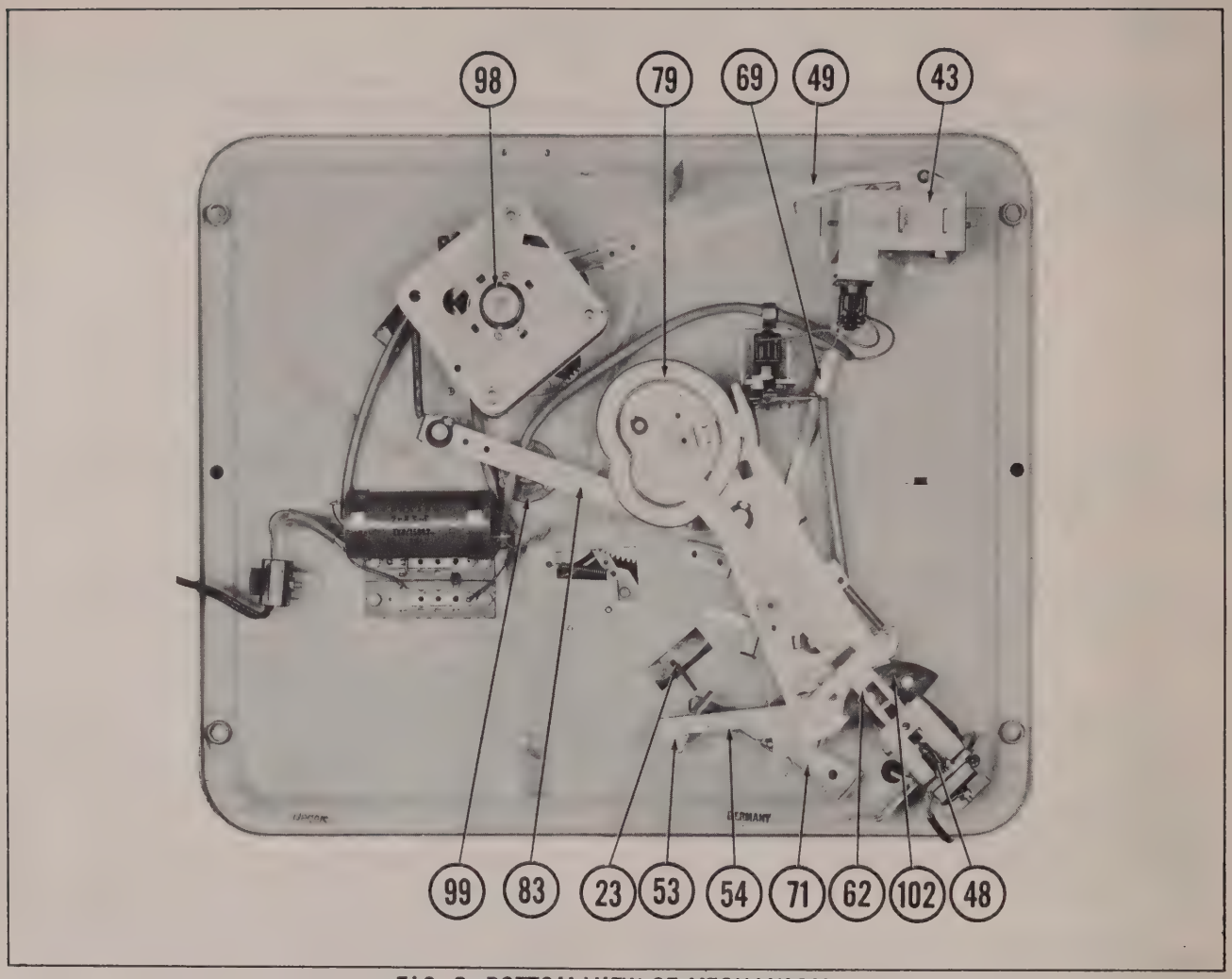


FIG. 3 BOTTOM VIEW OF MECHANISM

Roller (80), part of cam disc (79), strikes spindle acutating lever (83) and moves reject lever (19A) forward in spindle (19), dropping a record to the turntable.

Tone arm (5) is now free to start its inward motion. Cam disc (79) has reached a point where control lever (52) is moving toward the rear of the changer. Control lever (52) strikes stop lever (59) and moves stop lever (59) toward spindle (19). Control lever (52) also carries tone arm (5) with it at the same time. When tone arm (5) is directly over the lead-in groove of a record, the control rail is moved inward, causing tone arm (5) to lower into the lead-in groove of the record. Record selector arm (1) begins to swing outward. After a one and one-quarter rotation of the turntable, record selector arm (1) is completely out of the way, and the change cycle is in its out-of-cycle position.

Automatic Stop

If no records are on spindle (19), record selector arm (1) swings its full arc. Stop piece (71) is connected to the other end of record selector arm (1) and is moved forward all the way, contacting changing bar (69). As record selector arm (1) and stop piece (71) start to move backward, they push changing bar (69) toward the front of the changer. Since changing bar (69) is connected to push-button assembly (43), the Stop button is pulled down, and start and stop switch (44) is shut off. The power to the motor is cut off, and the changer stops.

ADJUSTMENTS

Selector Arm Adjustment

Rotate cam disc (79). This positions control lever (52) so that record selector arm (1) is free. Put a 12" record on spindle (19) and manually lead record selector arm (1) to the edge of the record. Loosen screw (72). Twist stop piece (71) on its shaft. Stop pin (59A) of stop lever (59) will move before the 12" stop at a distance of 1/64" to 3/64" and will strike against the 10" stop. Tighten screw (72).

Conical spring (75) must be so mounted that it twists record selector arm (1) counterclockwise. Make sure record selector arm (1) is properly adjusted for the rest position. Turn cam disc (79) to its rest position notch. Stop piece (71) must be so placed that the distance between the nearest part of stop piece (71) to the edge of the chassis plate is from 19/32" to 23/32". If the distance is not correct, regulate adjusting angle (54) on angular lever (53).

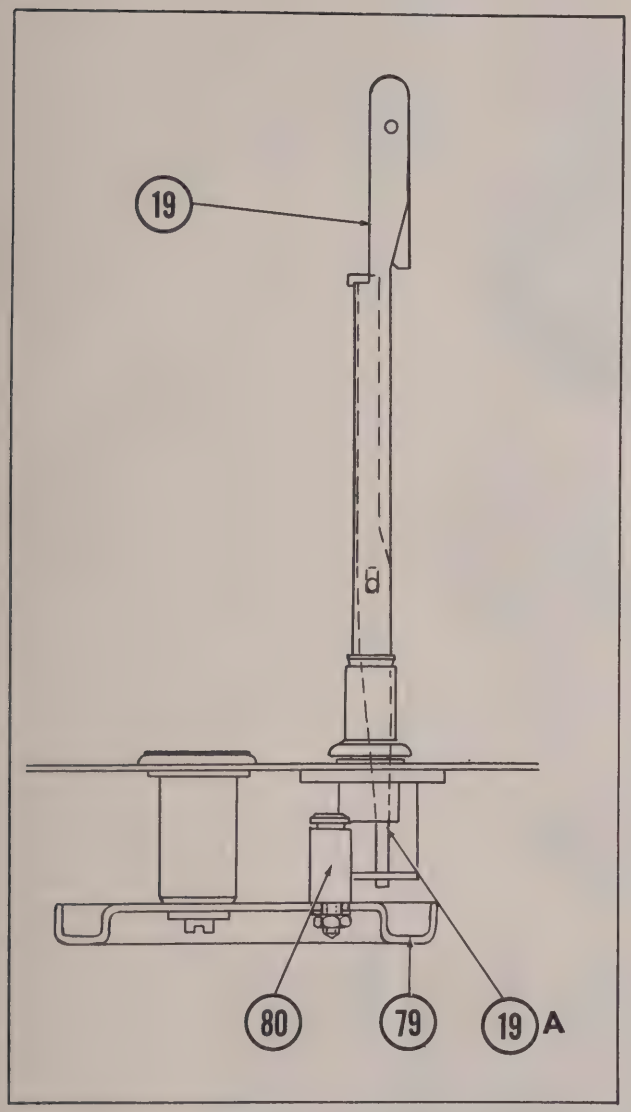


FIG. 4 SPINDLE TRIPPING DIAGRAM

Horizontal Tone Arm

Tone arm (5) must swing inward fast enough to reach the edge of a 7" record before the downward movement begins. If the downward movement begins too soon, driver piece (52A) must be bent slightly toward friction sector (102). If driver piece (52A) is bent too close to friction sector (102), tone arm (5) will be dragged across the record after record selector arm (1) has swung outward.

Bent Spring Adjustment

Bent spring (18) must be fixed to the turntable hub sufficiently to operate the change mechanism. The radius of bent spring (18) must be 1/64" from tilting lever (23) in the out-of-cycle position.

Vertical Tone Arm

Turn cam disc (79) to its notch position. Loosen both set screws of adjusting ring (64). Place an object 3/4" high beneath the needle of the cartridge. Press adjusting ring (64) upward slightly against control rail (62) and tighten. Drawing bar (10) must not be pressed upward; it must be pulled down slightly. If tone arm (5) is adjusted properly, it will pass freely over a 1" stack of records on turntable (4) and will clear the underside of a record on spindle (19). Tone arm (5) will also set low enough to reach a single record on the turntable.

Needle Setdown

Record selector arm (1) must be adjusted (see "Selector Arm Adjustment") before the needle setdown can be adjusted. Place a 10" record on the turntable and another 10" record on spindle (19). Twist cam disc (79) so that record selector arm (1) can move freely. Manually lead record selector arm (1) to the edge of the 10" record. Loosen screw (56) on stop lever (59). Place needle of the pickup cartridge into the lead-in groove of the record on the turntable. Turn stop lever (59) until stop pin (59A) touches stop piece (71). Tighten screw (56), but make sure the tone arm shaft can be turned freely with a light axial play of 1/64".

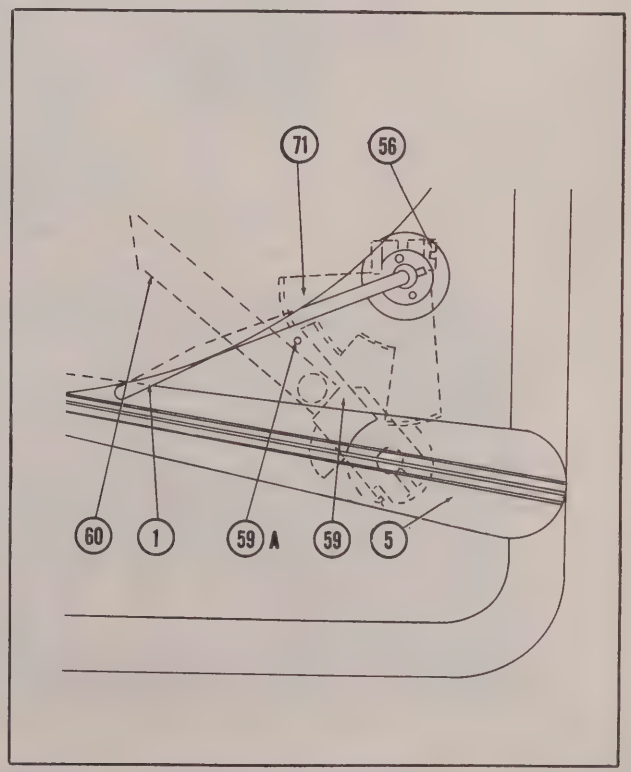


FIG. 5 RECORD SIZE SELECTOR ARM DIAGRAM

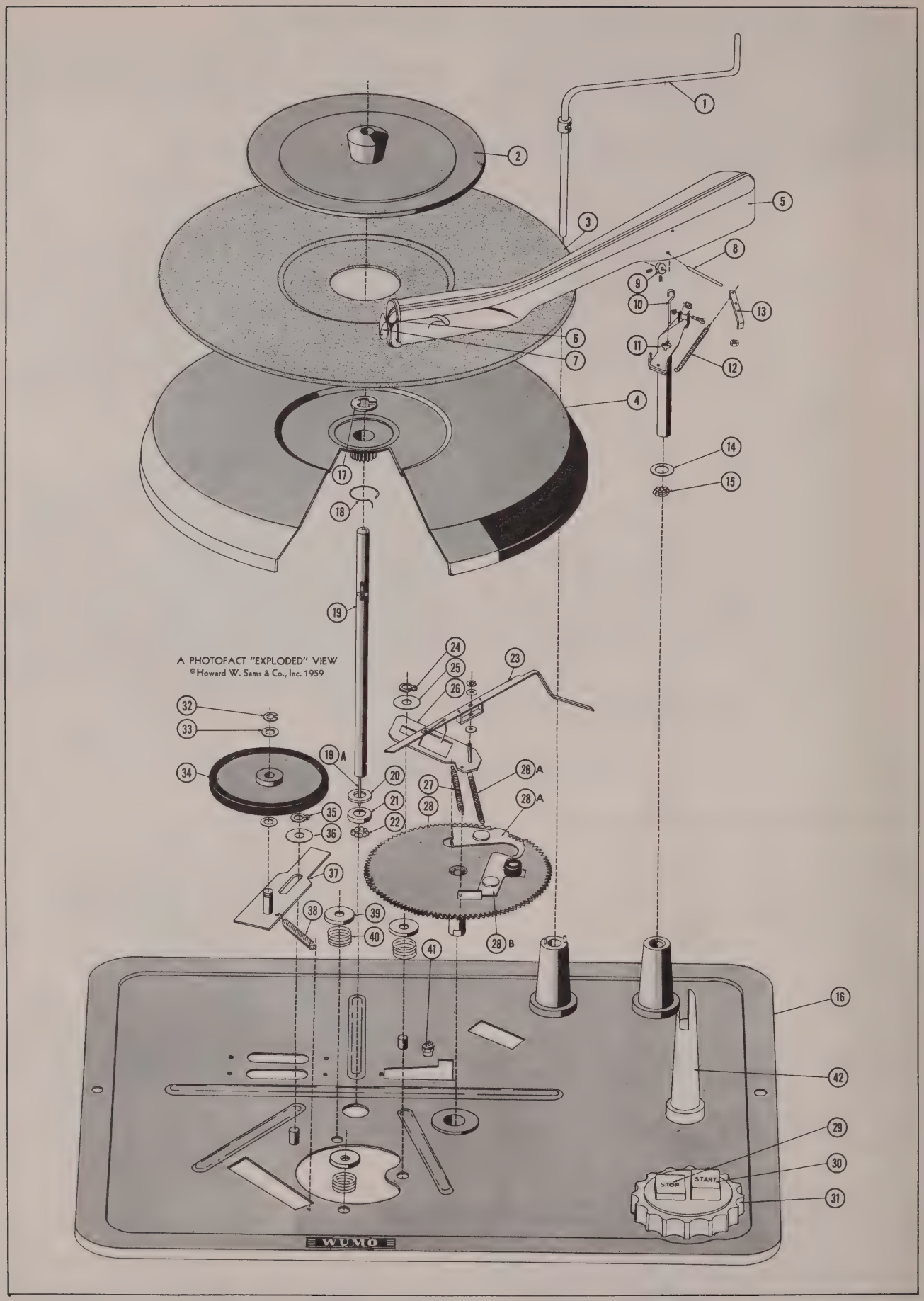


FIG. 6A EXPLODED VIEW OF PARTS ABOVE BASEPLATE

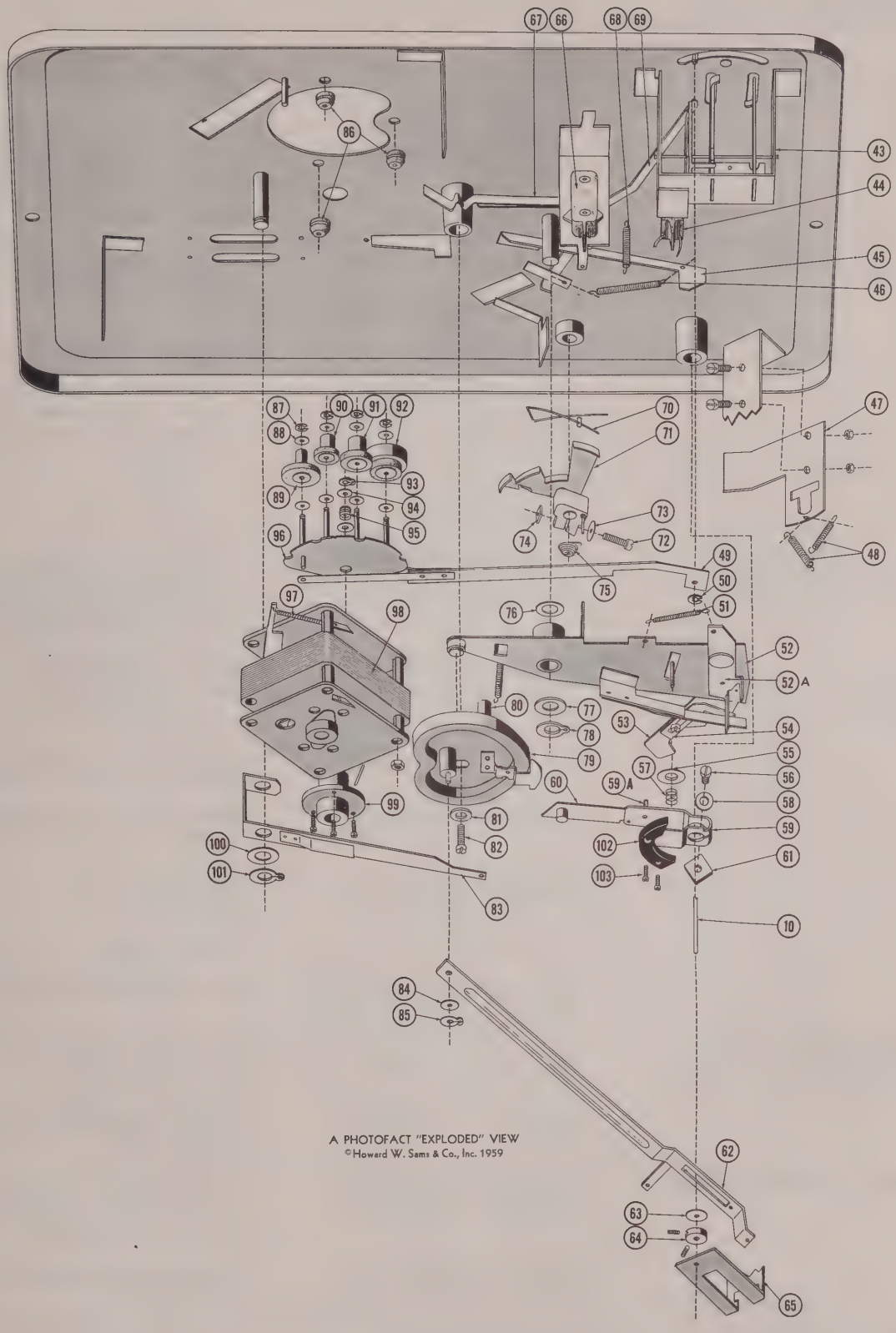


FIG. 6B EXPLODED VIEW OF PARTS BELOW BASEPLATE

TROUBLE CHART

Symptom	Cause	Remedy
Turntable does not rotate when Start button is depressed.	1. Defective AC connections.	1. Check AC leads for continuity.
	2. Speed control knob set on O.	2. Turn speed control knob to desired speed.
	3. Friction wheel (34) does not contact the turntable rim.	3. Check friction wheel tension spring (38) for proper tension and connection.
	4. Defective motor coil.	4. Replace motor.
Turntable rotates too slowly.	1. Bind in turntable bearing.	1. Check for foreign matter in bearing. Clean and lubricate.
	2. Low AC voltage.	2. Check line voltage.
	3. Friction wheel (34) and rubber motor pulleys greasy or oily.	3. Clean turntable rim, rubber tires of friction wheel (34), and motor pulleys with naptha or alcohol.
	4. Speed control knob improperly set.	4. Set to desired speed.
Turntable slows down or stops while cycling.	1. Friction wheel (34) does not contact turntable rim properly.	1. Friction wheel mounting slide (37) binding. Free friction wheel mounting slide (37) and check for foreign matter.
	2. Friction wheel tension spring (38) missing or loose.	2. Replace friction wheel tension spring (38).
	3. Bind in turntable bearings.	3. Check for foreign matter in bearings. Clean and lubricate.
	4. Temperature too low.	4. Changer should be operated at a higher room temperature.
	5. Changing mechanism jammed or tight	5. Free mechanism of obstruction.
	6. Defective motor.	6. Replace motor.
	7. Friction wheel (34) and rubber motor pulleys greasy or oily.	7. Clean with naptha or alcohol.
Changing mechanism does not cycle when Start button is depressed.	1. Changing bar (69) does not move tilting lever (23).	1. Tilting lever (23) binding. Free tilting lever (23).
	2. Bent spring (18) loose or missing.	2. Tighten or replace bent spring (18).
Changer cycles continuously.	1. Control wheel coupling (28A) binding, or spring (27) loose.	1. Check for binding in pivot of control wheel coupling (28A), or replace spring (27).
	2. Defective automatic shutoff switch (66).	2. Replace automatic shutoff switch (66).
Changer stops after one cycling, and tone arm remains on record.	1. Spring (46) too strong, thereby holding changing bar (69) against hold-down bar (45).	1. Loosen spring (46), and check for burrs on hold-down bar (45).

TROUBLE CHART (Con't)

Symptom	Cause	Remedy
Record does not fall while changer is cycling.	1. Control lever (52) loose.	1. Replace retainer (78).
	2. Reject lever (19A) not moved far enough by roller (80).	3. Roller (80) bent; straignten.
Several records fall at same time.	1. Records too thin	1. Replace records.
	2. Spindle (19) bent.	2. Straighten or replace spindle (19).
	3. Record improperly placed on spindle (19).	3. Reposition record.
Records fall on tone arm.	1. Centerhole too small.	1. Make centerhole larger.
	2. Reject lever (19A) does not push record far enough.	2. Check roller (80) for bent 2. shaft.
Tone arm remains in up position.	1. Drawing bar (10) bent or tight in bearing.	1. Straighten or free drawing bar (10).
	2. Vertical controls not adjusted properly.	2. See "Vertical Tone Arm Adjustment."
Tone arm touches record from below or on the turntable.	1. Improper tone arm vertical adjustment.	1. See "Vertical Tone Arm Adjustment."
Changer fails to cycle after playing a record.	1. Record has no fast finishing groove.	1. Only records having a fast finishing groove will actuate the automatic tripping.
	2. Defective record.	2. Replace record.
	3. Bent spring (18) missing or loose.	3. Replace or tighten bent spring (18).
	4. Control wheel coupling (28A) binding, or spring (27) too weak.	4. Free control wheel coupling (28A), or replace spring (27).
Changer cycles before needle reaches end of record.	1. Record centerhole too large.	1. Defective record.
	2. Record centerhole eccentric.	2. Defective record.
	3. Dragging lever (60) tight.	3. Loosen dragging lever (60).
Needle does not track properly on record.	1. Needle has gathered dust and lint.	1. Clean needle.
	2. Pickup wires too short, hindering the tone arm movement.	2. Lengthen wires.
	3. Changer not level.	3. Level changer with a torpedo level.
	4. Tone arm (5) binding in its bearing.	4. Clean and lubricate bearing.
Changer does not stop after the last record.	1. Automatic shutoff switch (66) does not operate.	1. Replace automatic shutoff switch (66).

TROUBLE CHART (Con't)

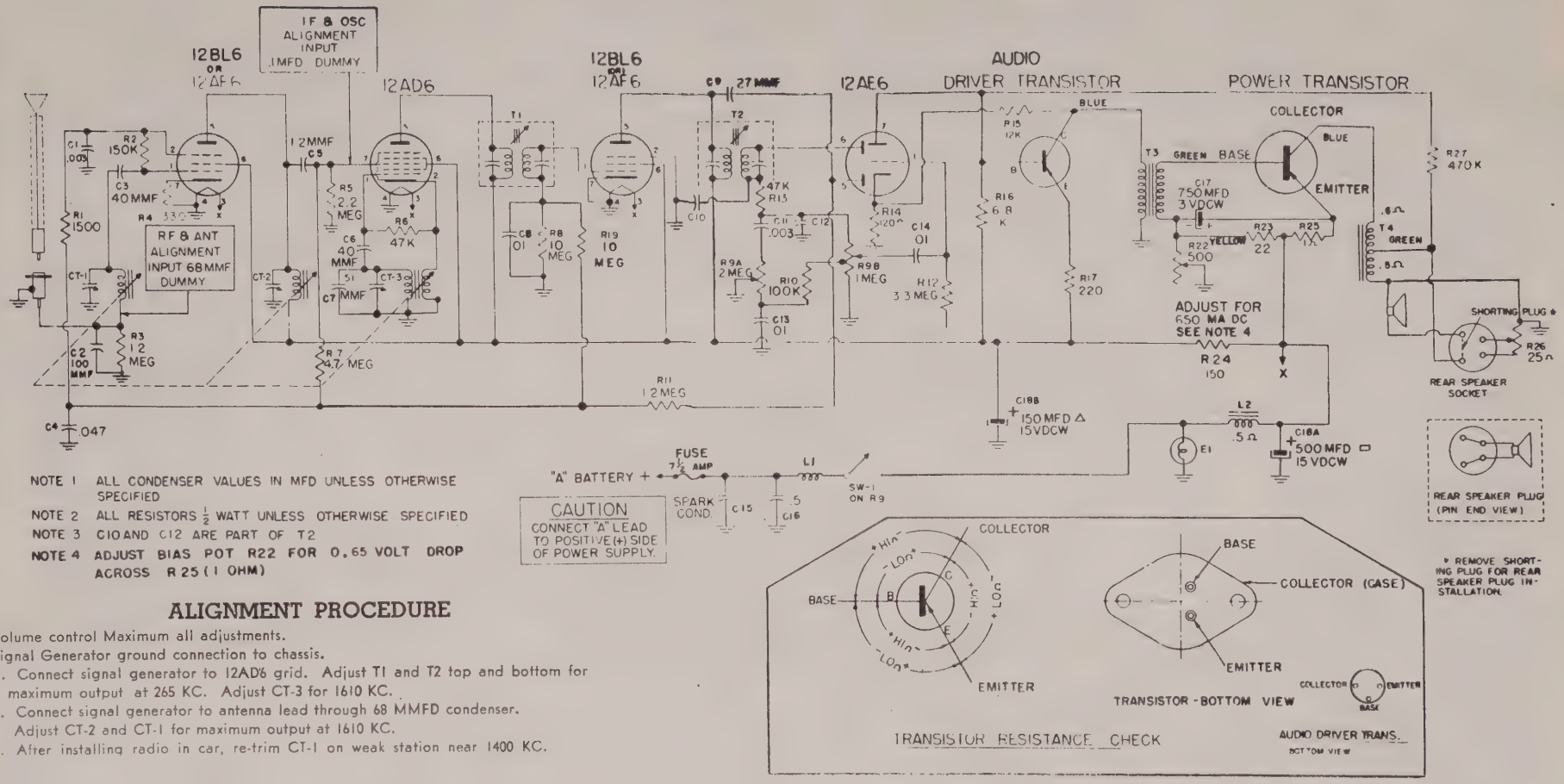
Symptom	Cause	Remedy
Tone arm does not set down properly into the run-in groove.	1. Tone arm (5) not properly adjusted.	1. See "Neelde Setdown Adjustment."
Tone arm sets down at 10" on a 12" record.	1. Record selector arm (1) is not pushed outward by the falling record because stop piece (71) is not adjusted properly.	1. See "Selector Arm Adjustment."
Tone arm drags across record.	1. Needle broken, missing, or bent.	1. Replace needle.
Coarse tone arm movement.	1. Horizontally: Ball bearings on tone arm socket dirty; tone arm shaft (11) tight.	1. Clean and lubricate tone arm shaft ball bearings (15) and tone arm shaft (11).
	2. Vertically: Drawing bar (10) tight.	2. Clean and lubricate drawing bar (10).
Record wear.	1. Tone arm (5) tight.	1. Check tone arm (5) for freedom of movement.
	2. Needle broken.	2. Replace needle.
Noise while a record is playing.	1. Noisy motor.	1. Clean motor bearing and and lubricate.
	2. Defective turntable ball bearings. Missing balls.	2. Replace balls.
	3. Defective record.	3. Replace record.
	4. Insufficient lubrication.	4. Lubricate all bearings.
Wow.	1. Eccentric record hole.	1. Replace record.
	2. Record hole too large.	2. Replace record.
	3. Speed fluctuation, caused by eccentric friction wheel (34).	3. Replace friction wheel (34).
No sound while playing.	1. Defective pickup cartridge.	1. Replace pickup cartridge.
	2. Cartridge connection disconnected.	2. Replace and solder connection.
	3. Cartridge leads open.	3. Replace cartridge leads.
	4. Muting switch (67) shorted.	4. Remove short.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	455-216	Record Selector Arm With Collar
2		Record Hold Down Disc.
3		Rubber Mat For Turntable
4	455-401	Turntable
5	455-300-e	Tone Arm, Ivory, Minus Plug-in System and Cartridge
	455-300-b	Tone Arm, Brown, Minus Plug-in System and Cartridge

Ref. No.	Part No.	Description
6	456-305-e	Plug-in System Minus Cartridge, Ivory
	456-305-b	Plug-in System Minus Cartridge, Brown
7	T0-284	Cartridge Crystal
	55-TJ	Cartridge Ceramic
8		Tone Arm Pivot Pin
9	455-223	Tone Arm Pivot Pin Ring Retainer
10	455-301-2	Drawing Bar
11		Tone Arm Shaft
12		Tone Arm Tension Spring
13		Tone Arm Tension Adjusting Bar
14		Tone Arm Shaft Washers
15		Tone Arm Shaft Ball Bearings
16	455-201	Chassis Plate
17		Turntable Retainer
18	456-402-3	Bent Spring
19	455-204	Spindle
19A		Reject Lever (Part of Item 14)
20		Washer
21		Ball Race
22		Ball Bearing
23	455-213	Tilting Lever
24		Retaining Ring
25		Washer
26	455-221	Tilting Lever Mounting Slide
26A		Spring
27	455-202-3	Spring
28	455-205	Control Wheel
28A	456-205-3	Control Wheel Coupling
28B	455-211	Latch
29		Stop Button
30		Start Button
31	455-217	Speed Control Knob
32		"C" Retainer
33		Washer
34	456-206	Friction Wheel
35		Retainer
36		Washer
37	456-205	Friction Wheel Mounting Slide
38	456-202-15	Friction Wheel Tension Spring
39	149-108-1	Motor Mounting Cap
40		Motor Mounting Springs
41	456-202-8	Eccentric Piece
42		Tone Arm Rest(Specify Color)
43		Push Button Assembly
44		Start and Stop Switch
45		Hold Down Bar(Part of Chassis Plate)
46	455-202-14	Spring
47		Control Rail Guide Plate
48		Control Rail Springs
49	456-202-4	Speed Control Lever
50		Retainer
51		Control Lever Spring
52	455-208	Control Lever
52A		Driver Piece(Part of Control Lever)
53		Angular Lever(Part of Control Lever)
54	455-208-6	Adjusting Angle
55		Washer

Ref. No.	Part No.	Description
56	M5X50D1N84	Screw
57	455-202-8	Spring
58		Washer
59	455-209	Stop Lever
59A	455-209-2a	Stop Pin
60		Dragging Lever (Part of Stop Lever 59)
61		Nut
62	455-226	Control Rail
63		Washer
64	455-223	Adjusting Ring
65		Mounting Bracket
66		Automatic Shutoff Switch
67	455-219	Muting Switch
68		Automatic Shutoff Switch
69	455-215	Changing Bar
70		Record Size Selector Arm Spring
71	455-224	Stop Piece
72	M5X15D1N84	Screw
73		Washer
74		Nut
75	455-216-3	Conical Spring
76		Washer
77		Washer
78		Retainer
79	455-206-a	Cam Disc
80	455-206-3	Roller
81		Washer
82		Screw
83	255-214	Spindle Actuating Lever
84		Washer
85		Retainer
86		Rubber Motor Grommets
87		"C" Retainer
88		Washer
89		Pulley (16 2/3 RPM) Gleichstr Batterie
		Pulley (16 2/3 RPM) Wechselstrom motor
90	149-205-b	Pulley (33 1/3 RPM) Gleichstr/ Batterie Motor
	149-205-a	Pulley (33 1/3 RPM) Wechselstrom Motor
91	149-204-b	Pulley (45RPM) Gleichstr./ Batterie Motor
	149-204-a	Pulley (45RPM) Wechselstr. Motor
92	149-203-b	Pulley (78 RPM) Gleichstr./ Batterie Motor
	149-203-a	Pulley (78 RPM) Wechselstr. Motor
93		Retainer
94		Washer
95		Spring
96	149-201	Pulley Pivot Plate
97		Spring
98		60 Cycle Motor
99		Spindle Bearing
100		Washer
101		Retainer
102	455-21-a	Friction Sector
103	M3X6D1N84	Screw



NOTE 1 ALL CONDENSER VALUES IN MFD UNLESS OTHERWISE SPECIFIED

NOTE 2 ALL RESISTORS ½ WATT UNLESS OTHERWISE SPECIFIED

NOTE 3 C10 AND C12 ARE PART OF T2

NOTE 4 ADJUST BIAS POT R22 FOR 0.65 VOLT DROP ACROSS R25 (1 OHM)

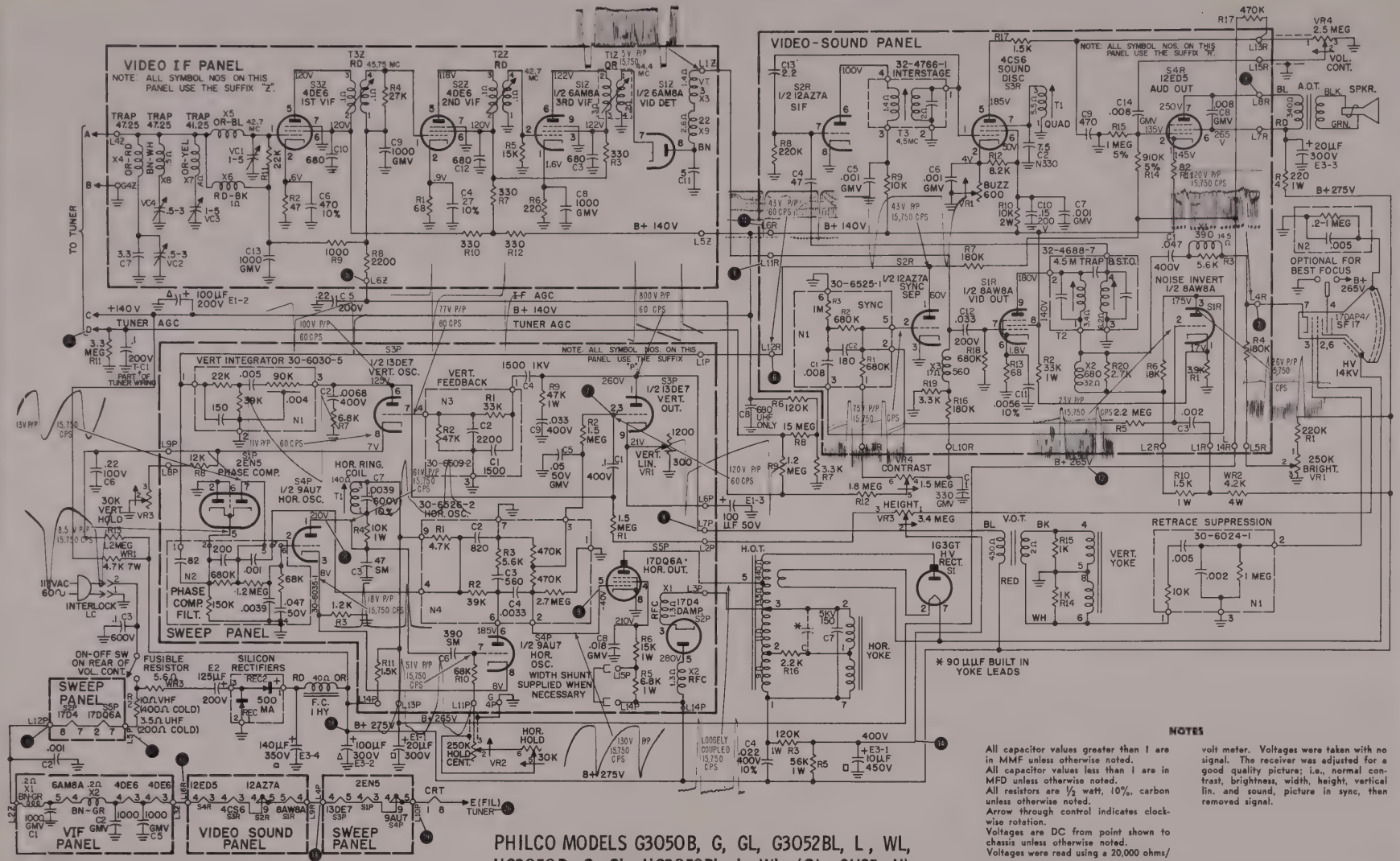
ALIGNMENT PROCEDURE

Volume control Maximum all adjustments.
Signal Generator ground connection to chassis.

1. Connect signal generator to 12AD6 grid. Adjust T1 and T2 top and bottom for maximum output at 265 KC. Adjust CT-3 for 1610 KC.
2. Connect signal generator to antenna lead through 68 MMFD condenser. Adjust CT-2 and CT-1 for maximum output at 1610 KC.
3. After installing radio in car, re-trim CT-1 on weak station near 1400 KC.

RIVERSIDE MODEL FJB-6679A
(1958 FORD)

Schematic Diagram Courtesy Montgomery Ward

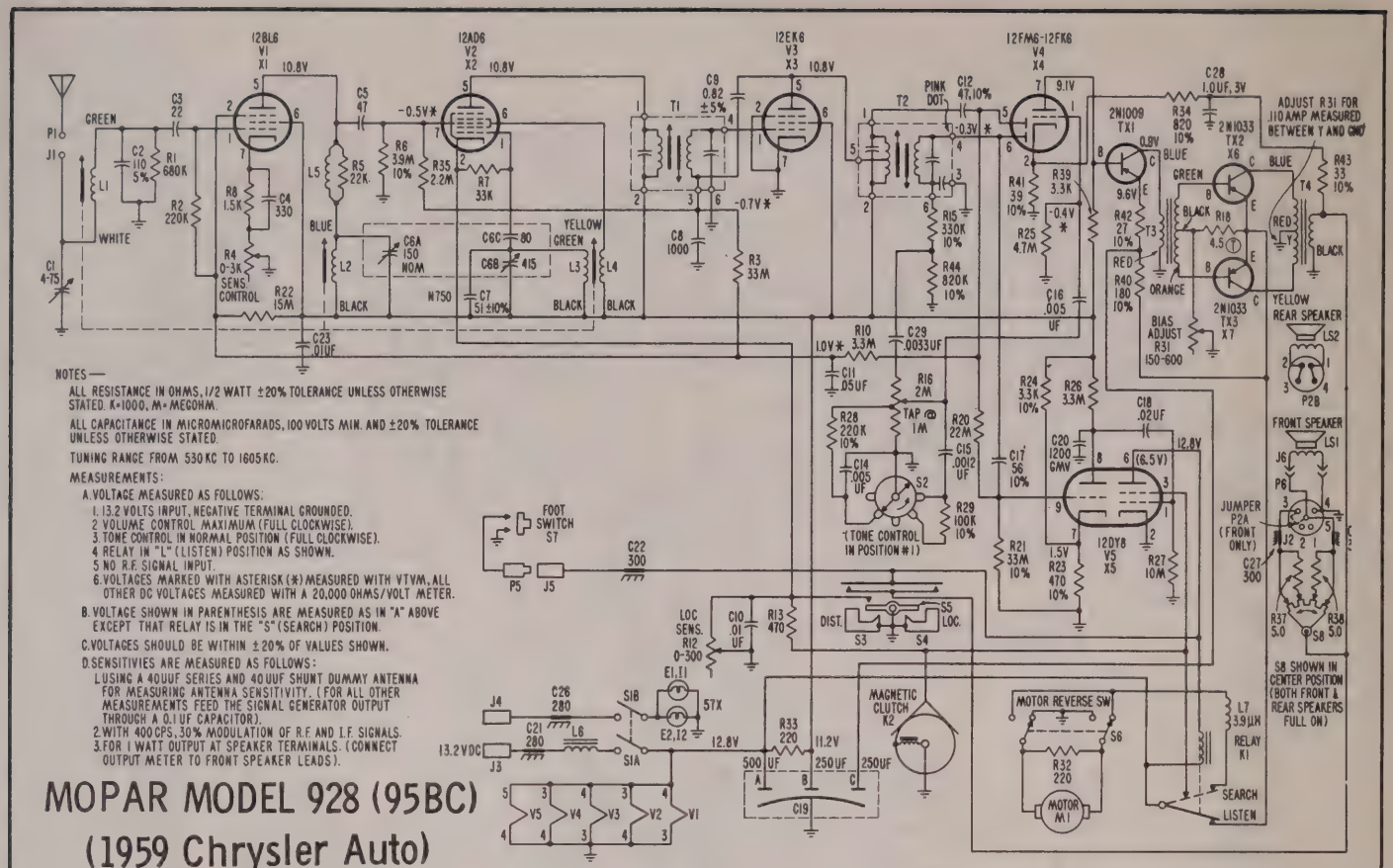


PHILCO MODELS G3050B, G, GL, G3052BL, L, WL, UG3050B, G, GL, UG3052BL, L, WL, (Ch. 9H25, U)

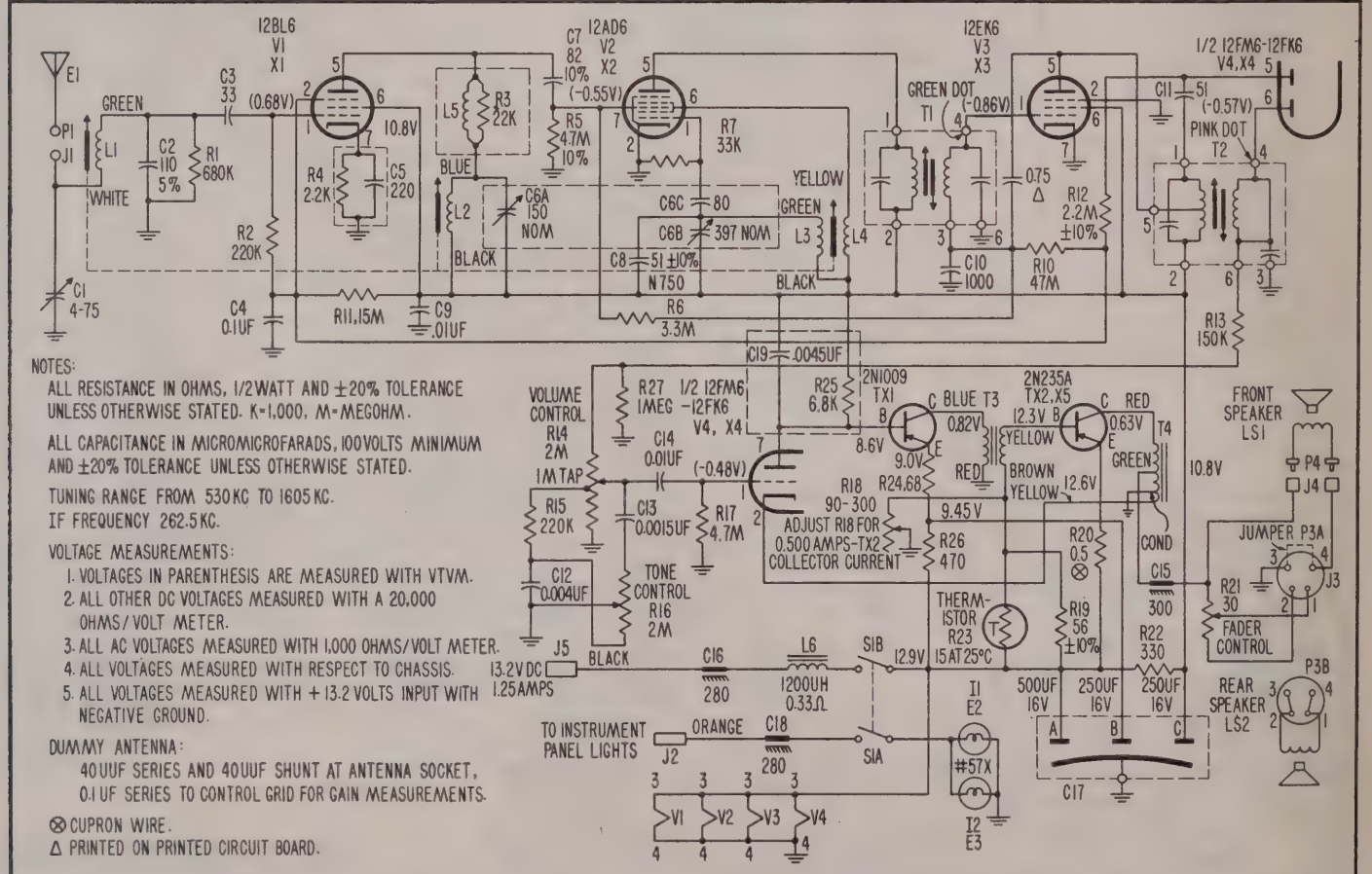
NOTES

All capacitor values greater than 1 are in MMF unless otherwise noted.
All capacitor values less than 1 are in MFD unless otherwise noted.
All resistors are ½ watt, 10%, carbon unless otherwise noted.
Arrow through control indicates clockwise rotation.
Voltages are DC from point shown to chassis unless otherwise noted.
Voltages were read using a 20,000 ohms/volt meter. Voltages were taken with no signal. The receiver was adjusted for a good quality picture; i.e., normal contrast, brightness, width, height, vertical lin. and sound, picture in sync, then removed signal.

Schematic Diagram Courtesy PHILCO CORP.


12BL6 V1 X1 10.8V
12AD6 V2 X2 10.8V
12EK6 V3 X3 10.8V
12FM6-12FK6 V4 X4
NOTES—
ALL RESISTANCE IN OHMS, 1/2 WATT ±20% TOLERANCE UNLESS OTHERWISE STATED. K=1000, M=MEGOHM.
ALL CAPACITANCE IN MICROMICROFARADS, 100 VOLTS MIN. AND ±20% TOLERANCE UNLESS OTHERWISE STATED.
TUNING RANGE FROM 530 KC TO 1605 KC.
MEASUREMENTS:
A. VOLTAGE MEASURED AS FOLLOWS:
1. 13.2 VOLTS INPUT, NEGATIVE TERMINAL GROUNDED.
2 VOLUME CONTROL MAXIMUM (FULL CLOCKWISE).
3. TONE CONTROL IN NORMAL POSITION (FULL CLOCKWISE).
4 RELAY IN "L" (LISTEN) POSITION AS SHOWN.
5 NO R.F. SIGNAL INPUT.
6. VOLTAGES MARKED WITH ASTERISK (*) MEASURED WITH VTVM, ALL OTHER DC VOLTAGES MEASURED WITH A 20,000 OHMS/VOLT METER.
B. VOLTAGE SHOWN IN PARENTHESIS ARE MEASURED AS IN "A" ABOVE EXCEPT THAT RELAY IS IN THE "S" (SEARCH) POSITION.
C. VOLTAGES SHOULD BE WITHIN ±20% OF VALUES SHOWN.
D. SENSITIVIES ARE MEASURED AS FOLLOWS:
1. USING A 40 UUF SERIES AND 40 UUF SHUNT DUMMY ANTENNA FOR MEASURING ANTENNA SENSITIVITY. (FOR ALL OTHER MEASUREMENTS FEED THE SIGNAL GENERATOR OUTPUT THROUGH A 0.1 UF CAPACITOR).
2. WITH 400 CPS, 30% MODULATION OF R.F. AND I.F. SIGNALS.
3. FOR 1 WATT OUTPUT AT SPEAKER TERMINALS. (CONNECT OUTPUT METER TO FRONT SPEAKER LEADS).
FOOT SWITCH S7
TONE CONTROL IN POSITION #1
MAGNETIC CLUTCH K2
MOTOR REVERSE SW
RELAY K1
SEARCH
LISTEN
MOTOR M1
ADJUST R31 FOR 110 AMP MEASURED BETWEEN Y AND GND
2N1009 TX1
2N1033 TX2 X6
2N1033 TX3 X7
BIAS ADJUST R31 150-600
YELLOW REAR SPEAKER
FRONT SPEAKER LS1
JUMPER P2A (FRONT ONLY)
S8 SHOWN IN CENTER POSITION (BOTH FRONT & REAR SPEAKERS FULL ON)

MOPAR MODEL 928 (95BC)
(1959 Chrysler Auto)


12BL6 V1 X1
12AD6 V2 X2
12EK6 V3 X3
1/2 12FM6-12FK6 V4, X4
NOTES:
ALL RESISTANCE IN OHMS, 1/2 WATT AND ±20% TOLERANCE UNLESS OTHERWISE STATED. K=1,000, M=MEGOHM.
ALL CAPACITANCE IN MICROMICROFARADS, 100 VOLTS MINIMUM AND ±20% TOLERANCE UNLESS OTHERWISE STATED.
TUNING RANGE FROM 530 KC TO 1605 KC.
IF FREQUENCY 262.5 KC.
VOLTAGE MEASUREMENTS:
1. VOLTAGES IN PARENTHESIS ARE MEASURED WITH VTVM.
2. ALL OTHER DC VOLTAGES MEASURED WITH A 20,000 OHMS/VOLT METER.
3. ALL AC VOLTAGES MEASURED WITH 1,000 OHMS/VOLT METER.
4. ALL VOLTAGES MEASURED WITH RESPECT TO CHASSIS.
5. ALL VOLTAGES MEASURED WITH + 13.2 VOLTS INPUT WITH NEGATIVE GROUND.
DUMMY ANTENNA:
40 UUF SERIES AND 40 UUF SHUNT AT ANTENNA SOCKET, 0.1 UF SERIES TO CONTROL GRID FOR GAIN MEASUREMENTS.
⊗ CUPRON WIRE.
Δ PRINTED ON PRINTED CIRCUIT BOARD.
ADJUST R18 FOR 0.500 AMPS-TX2 COLLECTOR CURRENT
TONE CONTROL R16 2M
THERM-ISTOR R23 15 AT 25°C
TO INSTRUMENT PANEL LIGHTS
#57X
FRONT SPEAKER LS1
REAR SPEAKER LS2
FADER CONTROL
JUMPER P3A

MOPAR MODEL 858 (94BC)
(1959 Chrysler Auto)

Schematic Diagrams Courtesy
Bendix Radio Div. of Bendix Aviation Corp.

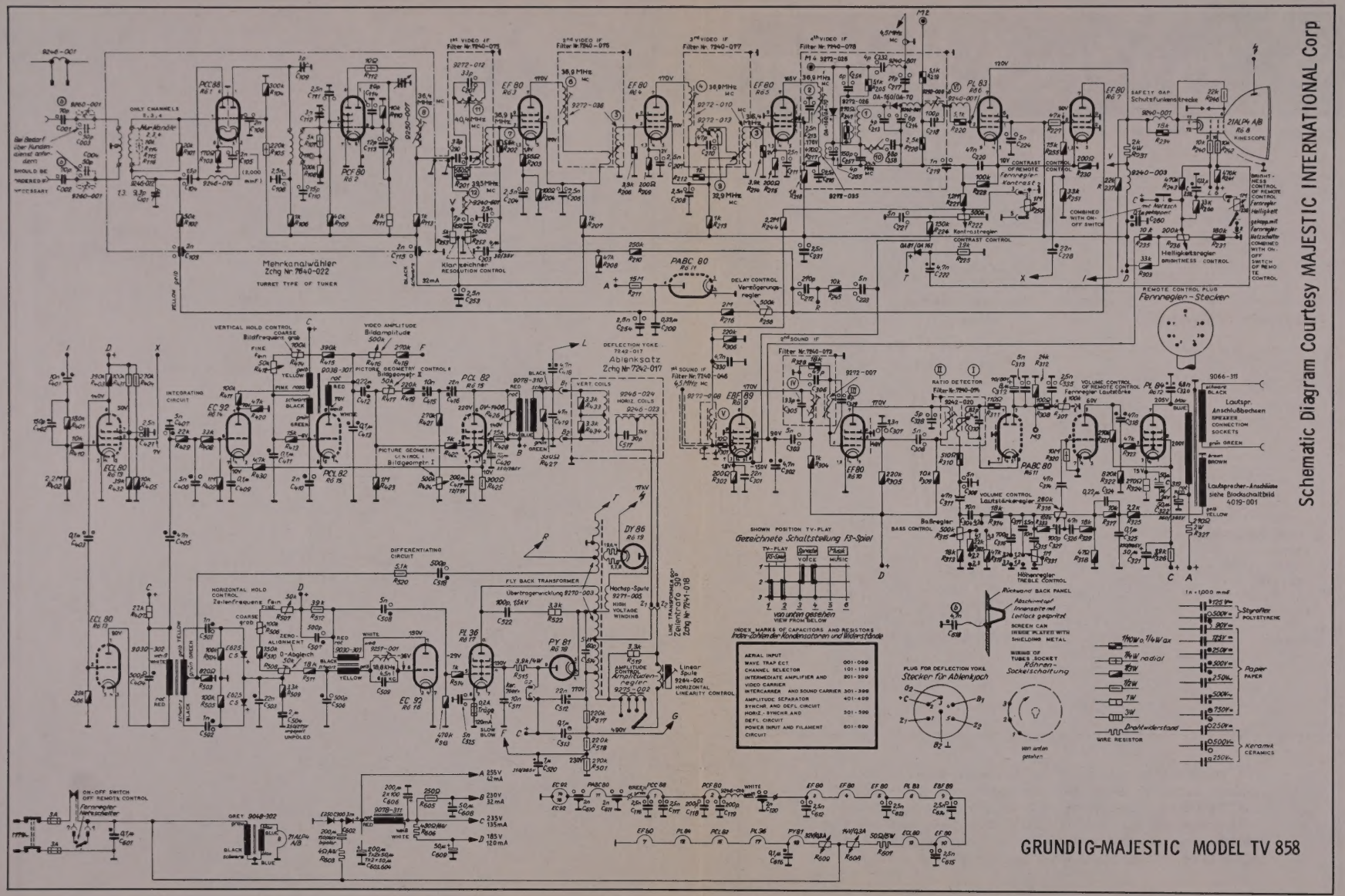
The PHOTOFACT Servicer

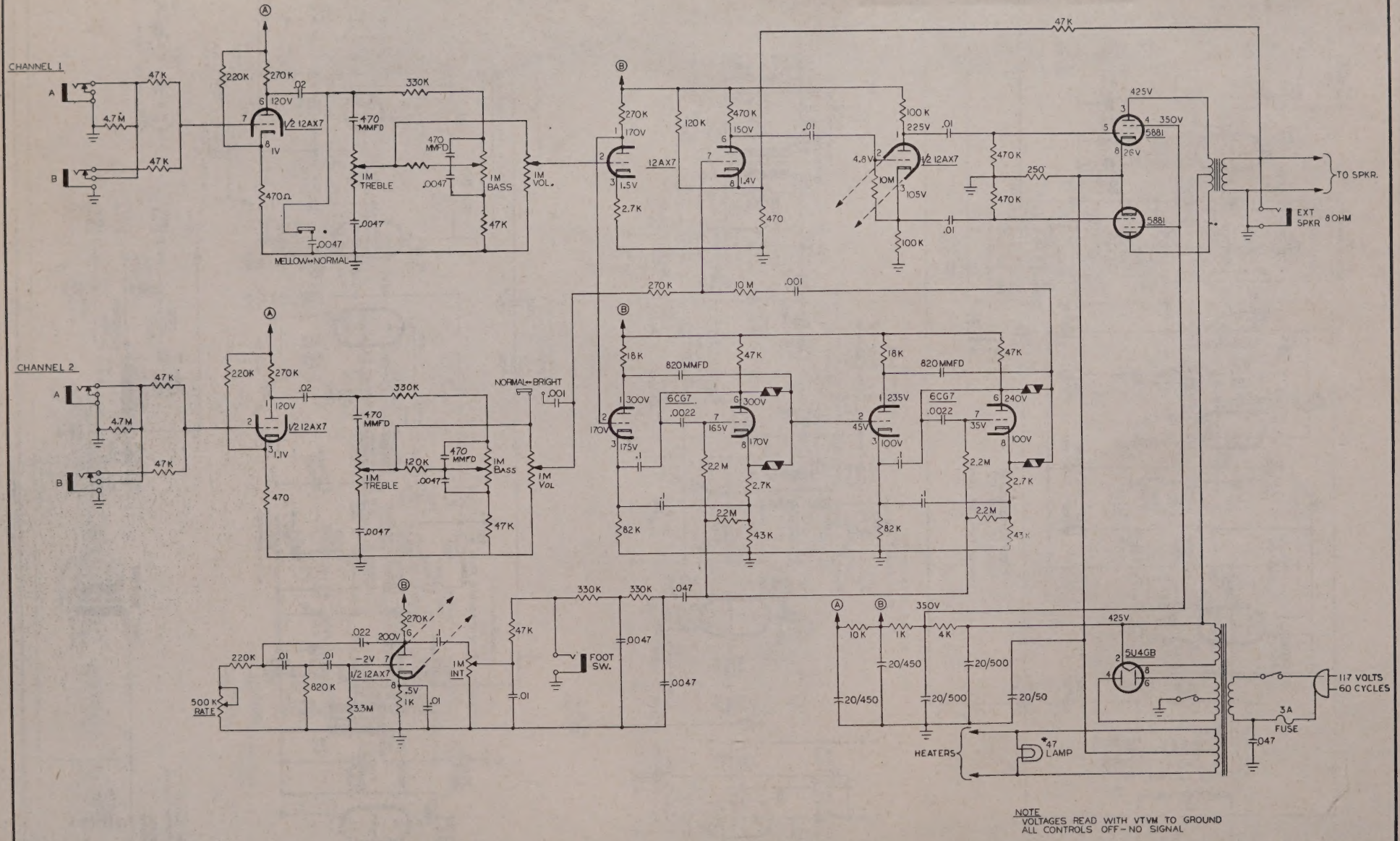
SET 429 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ JAN. 15, 1959

CONTENTS SET 429

TRADE NAME AND MODEL	SET AND FOLDER NO.
TELEVISION RECEIVERS	
PHILCO	
G4240, L, G4656S, G4658S, SL, SW, G4660S, SL, SM, G4662, P, G6628, L, G6632S, SL, SW, UG4240, L, UG4656S, UG4658S, SL, SW, UG4660S, SL, SM, UG4662, P, UG6628, L, UG6632S, SL, SW (Ch. 9L60, U)	429-1
ZENITH	
B2221R, RU, RUD, Y, YU, YUD, B2223E, EU, EUD, R, RU, RUD, Y, YU, YUD, B2225, E, EU, EUD, R, RU, RUD, U, UD, B2245, E, EU, EUD, R, RU, RUD, U, UD, B2246F, EU, EUD, R, RU, RUD, B2247E, EU, EUD, R, RU, RUD, B2249, H, HU, HUD, R, RU, RUD, U, UD, B2254E, EU, EUD, H, HU, HUD, R, RU, RUD, B2282, E, EU, EUD, R, RU, RUD, U, UD, B2673, E, EU, EUD, R, RU, RUD, U, UD, B3000E, R, B3001E, R, B3004, E, R, B3006, E, R, B3007E, R, B3008R, B3009, E, Y (Ch. 17B20, Q, U, UD, 17B21Q, 17B22, U, UD, 5B26, S-43723, S-43724, S-43894)	429-2
OTHER EQUIPMENT	
ARVIN	
8584 (Ch. 1.44600)	429-3
FANFARE	
221BSR, 222VM	429-4
FISHER	
100	429-5
GRANCO	
T-161	429-6
GROMMES	
20PG8	429-7
LEAK	
TL/12 Plus	429-8
OLYMPIC	
455	429-9
PHILCO	
T-9 (Codes 124, 126)	429-10
PILOT	
HF-42	429-11
ROLAND	
4TR	429-12
SILVERTONE	
9021, 9022, 9023, 90235 (Ch. 528.53300)	429-13
SPARTAN	
Chassis AMP-143AA, BA, BB	429-14
STEELMAN	
4AR10, 4AR10-1	429-15
WESTINGHOUSE	
H-649T7, H-650T7 (Ch. V-2392)	429-16
WUMO Record Changer	
Dekamix	429-17

The service information in this Servicer provides data on models which we have been unable to present in PHOTOFACT Folders. The receivers are not in current production; a requirement for PHOTOFACT coverage, and we are therefore presenting schematics and supplementary data that will be of assistance when servicing these models.


Schematic Diagram Courtesy MAJESTIC INTERNATIONAL Corp
GRUNDIG-MAJESTIC MODEL TV 858
Mehrkanalwähler
Zchg Nr 7840-022
TURRET TYPE OF TUNER
PABC 80
DELAY CONTROL
Verzögerungsregler
REMOTE CONTROL PLUG
Fernregler-Stecker
Lautsprecher-Anschlüsse
siehe Blockschaltbild
4019-001
Gezeichnete Schaltstellung F3-Spiel
Rückwand BACK PANEL
Stecker für Ablenkjoch
Röhren-Sockelschaltung
Paper
Keramik
CERAMICS
WIRE RESISTOR
Drahtwiderstand



NOTE
VOLTAGES READ WITH VTVM TO GROUND
ALL CONTROLS OFF - NO SIGNAL

MAGNATONE INSTRUMENT AMPLIFIER

MODEL 260-A

Schematic Diagram Courtesy MAGNA ELECTRONICS INC